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ANNUAL
REPORT

PLANT INDUSTRY DIVISION

Alberta
AGRICULTURE

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Alberta Agriculture
7000 - 113 street
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OR
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PLANT INDUSTRY DIVISION

Annual Report

June, 1987

PLANT INDUSTRY DIVISION

In 1986-87 the Plant Industry Division of Alberta Agriculture was comprised of five branches. The Crop Protection and Soils branches were located in Edmonton, Tree Nursery and Horticulture Centre in Oliver, Field Crops in Lacombe and Alberta Horticulture Research Center in Brooks.

Effective April 1, 1987 an official name change was implemented for the Alberta Horticulture Research Center. To reflect the increased role in research, development and extension activities relative to Special Crops the name was changed to Alberta Special Crops and Horticultural Research Center (ASCHRC).

The Division's main objective was to provide services in crop production and related sciences to Alberta growers. The production, nutrition and protection of plants used for food and for aesthetic purposes is fundamental to agriculture. Practices recommended to growers must be compatible with long term soil conservation, sustainable productive capacity and the safety of the entire population. The activities of all five branches are geared toward the attainment of these objectives.

This annual report provides more detailed information about the programs carried out by the branches of the Plant Industry Division and of their achievements during the 1986-87 year.

Through the administration of the following Acts these objectives are addressed: Weed Control Act, Agricultural Pests Act and the Bee Act.

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CROP PROTECTION BRANCH

The Crop Protection Branch operated with a staff of 29 permanent positions divided into three sections and an administrative group. Two word processing operators assigned at the Division level supported our work. During the year, Dr. Moe Hussain, Pesticide Issues Co-ordinator, accepted a position with Environment Canada in Ottawa. Mr. John Stenrue, Field Supervisor, Plant Pathology, retired after 35 years with the Department.

Objectives of Crop Protection Branch

1. To improve farm security and income by reducing losses caused by weeds, insects, diseases and other pests.

2. To reduce soil erosion due to wind and water by finding and promoting pest control methods which are less tillage intensive.

3. To develop and package technology to improve food production for delivery to farmers.

4. To assist the provincial effort to diversify crop production in Alberta.

All sections of the branch are committed to work toward the attainment of these objectives through a comprehensive program of publications, audio-visual training aids, displays and surveys of problem areas.

The Crop Protection Branch is responsible for the administration of the Weed Control Act, Agricultural Pests Act and the Bee Act.

WEED CONTROL

Responsibility for weed control remains with the landowner as designated in the Weed Control Act. The purpose of the Weed Control Section is to develop and manage weed control programs which will reduce losses to the agricultural economy and do so with the least environmental impact.

Major areas of responsibility were:

a. To prevent the establishment of weeds known to be capable of causing significant economic loss in the province.

b. To reduce the economic impact of established species.

c. To provide information, advice and guidance on weed control measures to land owners while leaving responsibility for control in their hands.

d. To ensure weed management techniques are compatible with soil conservation, crop management, and environmental considerations.

Trends observed in 1986 were:

- Lower grain and oilseed prices had an effect on weed control strategies. A reduction in pre-plant incorporated herbicides and a shift to post emergent materials was noted, and some fields were spot treated. These short term cost cutting measures resulted in increased weed seed populations which will have to be dealt with later.

- The agricultural chemical industry is adapting by reducing staff. The impact will be reduced service to the producer and a lower registration of products for minor crops and weeds. This is a sharp contrast to the needs of producers who are looking for control techniques for new weeds and on limited acreage crops.

- Municipalities are shifting from doing the weed control work themselves to ensuring that landowners are living up to their legal responsibilities. While this had been a significant shift in role, the end result has not changed significantly.

Programs

- Training and extension programs aimed at providing regional and district staff with updated technical information were offered. Courses on the latest weed control techniques, sprayer calibrations, the legal implications of weed growth and active participation in regional and district meetings, agricultural service board meetings, and specialized training schools for urban and industrial applicators reached a wide variety of clients.

- A major focus was on scentless chamomile with a significant awareness campaign and continued research on control measures. Fifty percent of the service boards in the province conducted some form of scentless chamomile program and more than 80% of the villages and hamlets on the urban weed control program focused on chamomile. Interest was high in the establishment of a chamomile free hay certification program.

Communications and Special Projects

- Co-operative printing of publications with other provinces was developed with attendant mutual financial advantages.
- Specialized operation manuals for specific problem weed control areas, such as railways, Alberta Transportation and municipal roads were updated.
- Weed plates and weed fliers were reprinted as required to aid municipalities in their weed awareness campaigns.
- Investigation designed to improve both native and cultivated pastures through the control of weeds and brush continued in two areas. The first involved suggesting appropriate actions for several Farming For The Future On Farm demonstrations involved with improving pastures. The second involved final observations which confirmed the efficacy of 2,4-D in controlling Pasture Sage.

Weed Research and Development

- Eight different weed control demonstration opportunities were offered to District Agriculturists and to Municipal Agricultural Fieldmen. Several Agricultural Service Boards took advantage of these opportunities and displayed the results through tours and other extension activities.

- Research projects were established in ten municipalities to develop information on the control of local weed problems, such as, stork's-bill, milkweed, tansy, scentless chamomile, toadflax and round-leaved mallow. The information obtained was reported to the Expert Committee on Weeds, the co-operating landowner and the Municipal Agricultural Fieldmen and District Agriculturists.

- Tall buttercup research work was completed and summaries in a poster prepared for the Expert Committee on weeds. An award for the best poster was received for the research work.

(i) Investigation continued, to develop means of inactivating residual herbicides as part of a well site reclamation program. This was a co-operative project with Industrial Vegetation Management Association of Alberta (IVMAA). Testing of various soil amendments, including activated carbon and manure continued. Information obtained is included in the procedure manual on reclamation produced by IVMAA.

(ii) Investigation of weed control in forages continued in two key areas. The first area investigated was the tolerance of forage legumes and grasses to a number of different herbicides. The second area investigated was the effect of weed control in the establishment year on the longevity of the stand. Information obtained is designed to fill information gaps and to assist Alberta farmers in producing better forages.

- The Weed Alert Program continued to provide information on the distribution and status of control efforts of certain key weeds. This program provides a continuity of information even when municipal officials change. The mapping capabilities of this program have been extensively used by other branches and divisions.

- "Crops of Alberta", a demonstration illustrating the diversity of crops and crop varieties grown in the province. A key feature in 1986 was the addition of historical and ancestoral varieties. Response to the demonstration was once more very positive.

Urban and Industrial Vegetation Management

- The knapweed eradication program continued in Regions I and II. Infestation levels have been reduced to isolated plants and several sites have been eradicated. All municipalities maintained a strong emphasis on eradication measures. Several municipalities used the tax notices to distribute Knapweed Awareness Brochures.

  British Columbia and Montana have continued their support of our program. British Columbia chemically treated the railway and highway west of the border in the Crownest Pass. Knapweed-free buffer zones have been established at the British Columbia/Alberta and Montana/Alberta borders.

- A first sighting of Dodder (parasitic plant) was reported in the Lethbridge area during 1986. The infestation was confined to one sugar beet field. By the end of summer the infestation was eliminated. Follow-up inspection in 1987 will be conducted to ensure its eradication.

- The Nodding Thistle eradication program has also progressed well during 1986. The City of Calgary maintained their enforcement and eradication measures and were able to further reduce the levels of infestation. The M.D. of Rockyview and the City of Calgary worked co-operatively to eradicate infestation on the borders of each municipality.

- The Urban Vegetation Management Program continued to produce positive effects from the joint programming of target weeds with the local Agricultural Service Boards. Grants were a major incentive for towns and villages in the initial establishments of programs.

- Kananaskis Country Park have established a good weed management program and this has resulted in a marked decrease in weed problems in highly visible areas. Fish Creek Park maintained control measures to prevent the further spread of Leafy Spurge.

- Guide to Crop Protection in Alberta - Part I - Chemical.
  Thirty thousand were printed. A new section on Rodenticides was added.

ENTOMOLOGY, PLANT PATHOLOGY AND APICULTURE

Responsibility for prevention and control of insect, plant disease, and honey bee pests remains with the producer as designated in the Bee Act and Agricultural Pests Act. The purpose of the section is to develop pest management strategies and programs which aid the agricultural sector to reduce losses, improve pest control decision making, and reduce the environmental impact of pest management practices.

The Crop Protection Branch, Entomology, Plant Pathology and Apiculture Section, is responsible for:

a. development, supervision and co-ordination of provincial monitoring and control programs.
b. staff training and extension programs.

c. contingency planning and programming to reduce the introduction and/or spread of new pests.

d. developing pest management programs for new specialty crops

e. developing better alternatives and approaches to pest management.

f. administration and implementation of the Bee Act and portions of the Agricultural Pests Act.

g. accelerating self-sufficiency and improving the management capabilities of beekeepers.

The Entomology, Plant Pathology and Apiculture Section is comprised of a provincial supervisor, 3 laboratory staff at Fairview, 3 apiculture staff at Falher and a provincial plant pathologist in headquarters. Additionally, wage personnel are hired as seasonal apiculture inspectors, and field assistants.

Entomology

1) Insect Situation 1986

Grasshoppers

Grasshopper populations decreased significantly but estimated area treated only decreased by 100,000 ha to 755,100 ha. The grasshopper population in the Drayton Valley to Evansburg area disappeared after a tremendous buildup in 1985. The second consecutive Grasshopper Assistance Program was in place for 1986 and again provided producers with a 50% rebate on their costs of insecticides. A total of 2.7 million dollars was expended as compared to 3.2 million dollars in 1985. The 1986 Grasshopper Forecast is included as a record of the change in infestation level (Figure 1).

Cutworms

Pale western cutworm infested about 28,000 ha in 1986, a decline of 75% from 1985. Infestations were spotty and damage less severe than expected because crop stands were in good condition to compensate for damage.

Monitoring of pale western cutworm by Agriculture Canada using pheromone traps reliably forecast the locations where cutworms were a problem. Moth catches in the fall of 1986 indicate that the adult population declined about 25% but there still is a risk of high larval populations in the spring of 1987, if conditions are dry.

Brown Wheat Mite

Brown wheat mites were present in many barley fields south of Highway #1. Initial treatments with Decis did not provide control and subsequently, Lorsban received registration. Fall egg populations were high in stubble fields and problems are anticipated in 1987. The mite was suspected of transmitting barley yellow streak mosaic.

Aphids

This year, late-seeded cereals in southern Alberta were severely damaged by the greenbug. High populations of this aphid were present in most of the area south of Highway #3 to the U.S. border and some of the area north and north west of Lethbridge. Green bug population were identified as far north as Edmonton.

About 1 million hectares were infested with greenbug and about 100,000 hectares were treated with dimethoate or malathion. Some late seeded crops were ploughed down as there was no possibility they could recover from the damage.

The greenbug problem was associated with later than normal planting of grain, early appearance of a heavy migration of aphids, and subsequent weather that favored a large buildup of aphid populations.

Cereal aphids were found at high levels in barley fields throughout central Alberta and the Peace River area in late July and early August. The infestation was late and damage appeared minimal.

1986 Grasshopper Forecast For Alberta

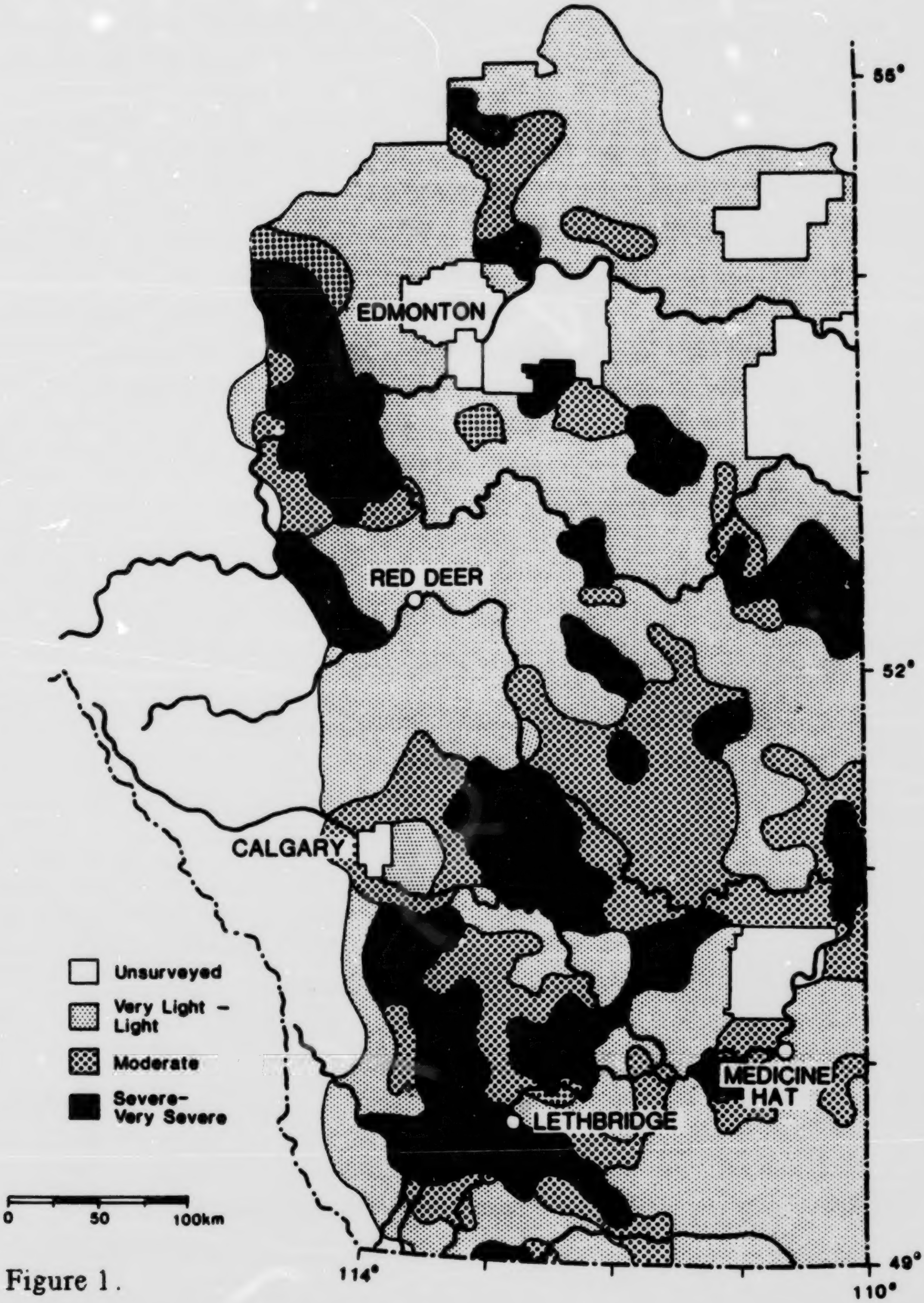
55°
EDMONTON
RED DEER
52°
CALGARY
MEDICINE HAT
LETHBRIDGE
49°
114°
110°
Unsurveyed
Very Light - Light
Moderate
Severe- Very Severe
0
50
100km

Figure 1.

Thrips

Barley thrips were present at easily detectable levels in the majority of barley fields throughout Alberta. Little spraying took place except where local aerial applicators stirred up business.

Wheat Stem Sawfly

The incidence of wheat stem sawfly has increased, and in some areas considerable damage occurred when susceptible varieties of spring wheat were left for straight combining.

Forage Insects

An estimated 5000 of Alberta's 6,000 ha of seed alfalfa production was treated, primarily with Furadan, to control alfalfa weevil. Spraying for weevil control also caused widespread honeybee losses (estimated 5,300 colonies). *Lygus* bug populations were low in Southern Alberta seed fields, perhaps because of the widespread spraying for alfalfa weevil control.

2) Monitoring/Surveying

The pheromone monitoring program for Bertha armyworm, redbacked, pale western, darksided and clover cutworms indicated that only pale western was a concern in southern Alberta with high numbers of redbacked cutworm being present in the Vegreville area.

A survey of 15 canola (Tobin) fields throughout the Peace region in mid-August indicated that *Lygus* species and flea beetles were the most numerous insect pest species present at that time. The *Lygus* species included *Lygus lineolaris*, *Lygus elisus*, *Lygus borealis*, and *Lygus rufidorus*.

Plant bugs were identified from sweep samples of three creeping red fescue and four smooth bromegrass fields taken in late July and from one fescue field sampled throughout the 1984 season, to determine the insects likely to cause silvertop and other damage to grass seed. The plant bugs, *Stenodema trispinosa*, *Stenodema vicina*, *Trigonotylus ruficornis*, *Litomiris debilis*, *Trigonotylus coelestialium*, *Labops hesperius*, *Capsus simulans* and *Lygus* spp. were found in the fields. *Capsus simulans* has been demonstrated to cause silvertop in bluegrass.

Verticillium Wilt

The cooperative provincewide survey on verticillium wilt of alfalfa showed that the disease continues to be confined to the irrigation region. (Table I). None of the 85 randomly selected fields surveyed in census divisions 6 to 15 were found to be infested with this disease. In census division 1 to 5, the area south of the Bow river, 8 of 42 fields had verticillium wilt, (31 irrigated and 11 dryland), all on irrigated land. Verticillium wilt was found in 9 of 51 fields north of Bow river, all on irrigated land. Three positive fields were located north of Rockyford, representing the most northernly occurrence of this disease in Alberta. In 1985, the disease was found in 2 dryland fields in census division 6.

TABLE I. VERTICILLIUM WILT OF ALFALFA SURVEY IN ALBERTA (1986)

Census Division	Townsite	Surveyor(s)	Fields Surveyed	Fields Infested
1	Bow Island/Medicine Hat	Huang	8	2
2	Lethbridge/Taber/Brooks	Howard/Huang	41	8
3	Cardston/Pincher Creek	Huang	2	3
4	Hanna	-	-	-
5	Vulcan/Strathmore/Three Hills	Howard/Huang	13	4
6	High River/Airdrie/Olds	Howard/Huang	19	-
7	Sedgewick	Berkenkamp/Piening	5	-
8	Red Deer	Slopek	11	-
9	-	-	-	-
10	Vegreville	Kharbanda	11	-
11	Edmonton/Fort Saskatchewan	Tewari	14	-
12	Smoky Lake	Kharbanda	7	-
13	Barrhead	Evans	11	-
14	-	Evans	1	-
15	Wanham/Grimshaw	Sippel	12	-
		Total	165	17

Blackleg

The blackleg survey continues to show the disease is confined to east central Alberta (Table II).

TABLE II BLACKLEG OF CANOLA SURVEY 1986

ARA*	CENSUS DIVISIONS	ACREAGE (THOUSANDS)	NO. OF FIELDS SURVEYED**	SURVEYOR	FIELDS INFESTED***
1	1 + 4	17.4	2	Harper	-
2	2 + 5	226.6	14	Howard	-
3	3,6 + 9	171.2	11	Howard	-
4A	7	441.5	24	Slopek	-
4B	10	582.3	37	Kharbanda	15
5	8 + 11	380.0	18	Evans	-
6	12,13 + 14	298.0	11	Tewari	-
7	15	683.0	38	Sippell	-
PROVINCE (Total)	-	2,800.0	146	-	15

* ARA = Agricultural Reporting Areas consisting of 1 to 3 census divisions.

** 1 field per 20,000 acres surveyed in each ARA.

*** Some 50 canola samples were submitted to the Alberta Environment Centre, Vegreville for blackleg diagnosis. Fifteen samples from 37 fields surveyed in census division 10 were found to be infected with the virulent isolate. Samples taken from all other regions were negative for this isolate.

3) Research

Research at the Fairview Laboratory centred on plant bugs in forages and the interaction between bertha armyworm and different varieties of canola. Since the entomologist position was not filled until early summer, the research conducted was strictly of a preliminary nature and major progress is not anticipated until 1987.

4) Disease Situation 1986

Alfalfa

Verticillium wilt continued to be confined to irrigated land except for two positive cases on dryland in 1985. The first verticillium wilt resistant alfalfa variety, Barrier, was released in 1986. Downey mildew was widespread as a result of the unusually wet July.

Canola

Rhizoctonia was widespread but patchy, particularly on well worked soils. Sclerotinia apothecia were recorded in all areas during July but occurrences of the disease were generally low. The continuous wet rainy conditions seemed to deter an outbreak of this disease even though the flowering period was long. Disease levels only reach 15-20%, even in fields with 40 bushel potentials and relatively high apothecia levels (5-10 per square metre).

In total, not more than 50,000 acres were treated to control sclerotinia. The sclerotinia forecast system again appeared to provide an accurate assessment of the need for control. Examination of canola fields in the fall confirmed that sclerotinia levels were generally in the 3-5% range with a few fields reporting greater than 50% infestations. In an irrigated canola field in southern Alberta with high disease potential, infection in the treated acreage was 10%. An unsprayed portion of the same field had a 90% infection level.

Blackleg continued to be confined to the east central region of the province, primarily along the Saskatchewan border. The virulent strain is common in about 50% of the fields surveyed in this region but infection levels are low. A few fields had a 15% level of infection.

Root rot continued to be the most common and serious disease in the Peace Region. Alternaria and staghead infections were generally low.

Cereals

Low bushel weights and lower than expected yields in barley and oats may have resulted due to a complex of factors including high infection levels of barley yellow dwarf virus in oats and barley, high aphid and thrips populations, foliar diseases and hot weather in August. In the Peace Region, dry conditions contributed to low disease levels in most crops. However, wet fall conditions allowed for late disease build-up, as in the rest of the province, innoculum levels of foliar diseases are high.

In central and Southern Alberta, high levels of foliar diseases, primarily scald and net blotch of barley and tan spot of wheat, occurred as a result of the humid conditions in July. However, since the onset of infection was late, losses were not severe except where crops were late. In the Peace Region, glume blotch infected 10% of the heads in 21% of wheat fields.

Barley yellow dwarf was at low levels (5%) in oat and barley fields across Alberta excluding the Peace. Loose smut was common at trace levels in all barleys and semi-dwarf wheats. Empress barley showed infection levels to 5%.

Stripe rust was severe on late sown soft white spring wheat. The disease was also reported on winter wheat where it may have overwintered. Take-all was unusually severe on Oslo wheat. Stem rust was common on late sown and secondary tiller growth of non-recommended hard red spring wheats.

5. Bacterial Ring Rot

Bacterial Ring Rot (BRR) of potatoes showed a decrease under the 1985 figures and was well under the four year average (1982-1985). The incidence of the disease, with one exception still remained at trace levels. No BRR was found in the following areas: Counties of Parkland, Lethbridge, Forty Mile, M.D. of Cypress, Edmonton Perimeter and Regions number 2 (Airdrie), 3 (Red Deer), 5 (Barrhead), and 6 (Peace River).

Of the 206 farms inspected, totalling of 23,224 acres, 3.0% of the farms and 1.3% of this acreage was infested with BRR. These figures are well below the previous 4 year average (1982-1985) of 7.8% of the farms and 2.7% of the acreage and represent the lowest incidence ever.

All seed potato growers field in the province were inspected by Agriculture Canada personnel. No BRR was detected in the 4,479 acres inspected.

For the 5th year, BRR trial plots for field observation were carried out at the Alberta Tree Nursery and Horticulture Centre in cooperation with Dr. S. DeBoer, Agriculture Canada Research Station, Vancouver, B.C. One of the trials in 1985 and 1986 showed that cut tubers from several ring rot resistant varieties of potatoes with symptomless latent BRR, when held in contact with the cut surfaces of healthy susceptible disease free tubers, readily transmitted the disease.

TABLE III. POTATO ACREAGE AND INCIDENCE OF BACTERIAL RING ROT IN ALBERTA - 1986

		NO. OF FARMS		ACREAGE		% INFESTED	
	YEAR	INSPECTED	INFESTED	INSPECTED	INFESTED	FARMS	ACREAGE
M.D. of Sturgeon	1986	17	1	1,935	125	5.9	6.5
Co. of Parkland	1986	3	0	1,055	0	0.0	0.0
Edmonton Perimeter	1986	4	0	272	0	0.0	0.0
Region 6							
Peace River	1986	10	0	260	0	0.0	0.0
Region 5							
Barrhead Area	1986	5	0	136	0	0.0	0.0
Region 4							
Vermilion Area	1986	17	1	1,295	1	5.9	0.1
Region 3							
Red Deer Area	1986	19	0	751	0	0.0	0.0

TABLE III - Continued

	YEAR	NO. OF FARMS INSPECTED	NO. OF FARMS INFESTED	ACREAGE INSPECTED	ACREAGE INFESTED	% INFESTED FARMS	% INFESTED ACREAGE
Region 2							
Airdrie Area	1986	17	0	193	0	0.0	0.0
Co. of Newell	1986	18	2	2,810	170	11.1	6.0
M.D. Cypress #1	1986	3	0	25	0	0.0	0.0
M.D. Taber	1986	41	0	12,814	0	0.0	0.0
Co. Forty Mile	1986	8	0	790	0	0.0	0.0
Co. Lethbridge	1986	10	0	707	0	0.0	0.0
Lethbridge Perimeter	1986	34	2	181	4	5.9	2.2
TOTALS		206	6	23,224	300	2.9	1.3

6) Diagnostics

The regional crops laboratory at Fairview continued to serve Region 6 in the areas of plant pathology and entomology diagnostics. This year a total of 316 specimens were processed (Table 1), up 19% from last year.

Table 1. Summary of Specimens Submitted, Fairview, 1986

Crop	#Disease Specimens	#Insect Specimens
Field Crops	34	25
Ornamentals	65	35
Shelterbelt	6	4
Vegetables	40	13
Fruits	20	9
Miscellaneous	1	64
Total	166	150

7) Apiculture

i. 1986 Production

Honey production in 1986 was approximately 24 million pounds; 13% higher than the 1985 crop. Average production was 120 lb/colony. A wet cool July was a major deterrent to production throughout Alberta. Region 3 had then highest production in 5 years while Region I again experienced drought and losses to insecticides.

The U.S. government implemented a buy-back support program. With a buy back price of 40¢/lb, a levy of 1 cent U.S. for a market promotion program, and a duty of 1 cent/lb on imported honey, the U.S. has effectively eliminated Canadian imports because we can not sell into that market competitively.

ii. Colony Statistics

Approximately 123,000 packages and queens were imported into Alberta, primarily from California. With increasing air freight costs, limited numbers of packages were imported from New Zealand.

An estimated 96,000 colonies were prepared for winter in 1986. The winter was particularly mild in most areas of the province resulting in a winter loss of about 4% as compared to 15% by March 1986. Most losses in 1987 could be attributed to queen failure, not starvation.

The registration information and inspection statistics were completely reviewed and updated. There are 1467 registered beekeepers operating 212,435 colonies in Alberta.

iii. Extension & Disease Control

Extension-related activities were limited in 1986 due to the resignation of the Supervisor of Apiculture in May. Inspection activities were also limited due to a reallocation of apiary field staff away from disease control to evaluation for insecticide spray damage in June and July.

A total of 221 beekeepers were contacted between April 1 and September 30. In all, 279 apiaries were visited and 2,499 colonies routinely examined for the presence of American Foul Brood (AFB) and European Foul Brood (EFB) diseases. This represents a sharp reduction in colonies inspected as compared to 1985 (16,000 colonies). There were 207 colonies found infected with AFA (8.3%). There were 93 re-inspection visits identifying 109 colonies of 1008 as being infected with AFB disease.

EFB was found in 18 colonies (0.51%). Several occurrences of a less common bacterial infection were isolated and cultured at the Regional Veterinary Laboratory at Fairview indicating the presence of Bacillus coagulens. It is susceptible to oxytetracycline used for AFB and EFB prevention and control. Symptoms are very similar to the disease called "half-moon disease" described in New Zealand and Australia.

A chalkbrood survey was conducted across Canada in cooperation with Beaverlodge Research Station. Limited information was collected in Alberta in May and June. Generally chalkbrood is at low levels but for unknown reasons, a few beekeepers have very severe infestations.

The honeybee tracheal mite, Acarapis woodi (HBTM) continues to cause concern to beekeepers in the U.S.A. and Canada. The Manitoba-Ontario border is again closed prohibiting the importation of package bees and queens from the U.S. and Western Canada into eastern Canada.

A total of 457 samples for mites were collected in Alberta in 1986. Eighty percent of these samples from package bees and 20% from overwintered colonies started as packages in 1985. The results did not indicate the presence of the honeybee tracheal mite in Alberta colonies.

iv. Pesticides

Colonies in southern Alberta were evaluated for losses due to Furadan during the summer of 1986. Many colonies recovered prior to being prepared for winter. Colonies were weighed in September to evaluate the possible impact on wintering. Early indications show that there has been a low overwintering mortality and that Furadan is not likely linked to wintering mortality.

v. Bee Breeding Project

The Alberta Bee Breeding program continued in 1986. Approximately 2,500 queens were released to producers. Additionally, two California package producers bought breeder stock to use in breeding queens for Canada. However, should package orders continue to decline the future of the program may be jeopardized. The closure of eastern Canada to Alberta produced queens has eliminated a large potential market.

PROBLEM WILDLIFE

Responsibility for prevention and control of wildlife depredation of crops and livestock remains with the producer, with assistance from the Municipal Agricultural Service Boards and A.S.B. Fieldmen.

The Crop Protection Branch, Problem Wildlife Section, is responsible for:

(a) supervision and coordination of provincial programs
(b) extension
(c) procurement and distribution of toxicants and control devices, and
(d) administration and implementation of portions of the Alberta Agricultural Pests Act.

The Problem Wildlife Section is comprised of a provincial supervisor, three regional supervisors, and four problem wildlife specialists. In addition, specialists were hired on a temporary basis to conduct coyote control in areas not easily serviced by permanent staff.

The Problem Wildlife Section is responsible for the supervision and coordination of three major programs: rat control, rabies suppression in skunks, and prevention and control of coyote depredations of livestock and poultry. In addition, the section provides extension services for the prevention and control of crop or livestock damage from field rodents (primarily pocket gophers and Richardson's ground squirrels), and nuisance birds (primarily magpies, blackbirds, sparrows and pigeons).

i) Rat Control

Alberta was kept essentially free of Norway rats for the 36th consecutive year. Rat control was conducted by the seven rural municipalities along the Alberta/Saskatchewan border in a control zone 30 km wide and 600 km long. The control program was conducted similar to previous years. A total of 8,061 inspections of farms, grain elevators and other premises were conducted by municipal and provincial pest control inspectors. Each premise was inspected from 1-3 times during the year. Infestations were eradicated by the cooperative effort of residents and government personnel (Table 1).

Within the interior of Alberta, suspected rat infestations continue to be reported by a concerned public. Most complaints were found to be muskrats, pocket gophers, wood rats or mice. Regardless, all suspected infestations were investigated by provincial and municipal pest control inspectors (P.C.I.s). Five rat infestations were confirmed within the interior of Alberta; one involved the keeping of rats by private individuals. Norway rats cannot legally be held in captivity in Alberta.

Table 1. NORWAY RAT CONTROL ON THE ALBERTA/SASKATCHEWAN BORDER - 1986/87

	Bait Used		Inspection			
		Water	of	Infestations		
Municipality	Dry (kg)	Soluble(L)	Premises	84/85	85/86	86/87
Bonnyville	617	0	1,273	0	1	1
Vermilion River	2,720	159	2,008	45	23	29
Wainwright	417	22	1,233	7	0	0
Provost	1,709	631	1,507	29	39	39
Special areas	1,766	163	1,088	12	9	24
Acadia	606	167	246	1	0	0
Cypress	910	200	706	0	0	0
	8,745	1,342	8,061	94	72	93

ii) Rabies Vector Control

The program to prevent the spread of rabies in Alberta, primarily in skunks, continued under the direction of the Central Rabies Control Committee.

Depopulation of skunks was conducted in conjunction with the rat control program along the Alberta/Saskatchewan border in the M.D. of Cypress, south of the South Saskatchewan River. Rabid skunks were taken in Saskatchewan within 10 km of the border east of the M.D. of Cypress. North of the South Saskatchewan River, skunk rabies moved westward and was reported near Marengo, 15 km east of the border near Sibbald, Alberta. Consequently, skunk control was conducted for rabies suppression in Special Areas No.3 commencing October, 1986.

Within the interior of Alberta a rabid skunk was confirmed in the County of Newell on January 3, 1986. This was the only skunk rabies reported in Alberta in 1986. Bat rabies continued to be low with only five confirmed cases in 1986. Confirmed cases of rabies in Alberta during 1979-86 are shown in Table 2.

Table 2. POSITIVE RABIES IN ALBERTA

	Skunks					
Year	Warner/Forty Mile	Newell	Elsewhere	Bats	Other	Total
1979	3	0	10	12	0	25
1980	53	0	1	11	1 cat	66
1981	22	1	0	9	1 dog	33
1982	14	29	0	7	1 horse	52
1983	27	3	2	5	3 cats	40
1984	4	3	0	5	1 dog	13
1985	6	1	1	4	1 human	13
1986	0	1	0	5	0	6

(iii) Coyote Depredation Prevention and Control

The primary objective of the coyote control program is to train producers to resolve their own problems with assistance from municipal agricultural fieldmen. Provincial problem wildlife specialists train agricultural fieldmen, assist with difficult cases and assist farmers when fieldmen cannot respond to requests for control.

Non-lethal preventive techniques such as electric fences and guard dogs are promoted. Their use is certain to become an accepted and wide spread technique to prevent coyote predation in the future.

The program relies heavily on the judicious use of toxicants. Human safety is emphasized. In addition, the importance of proper placement of toxicants is stressed to minimize non-target poisoning of wildlife and domestic animals. Cyanide guns and strychnine baits were the primary toxicants used for coyote control (Table 3), although single lethal dose 1080 baits were registered for use in 1984. In comparison to strychnine, single lethal dose 1080 baits are more specific to members of the dog family and less hazardous to humans, wildlife and domestic animals. Thus, 1080 will probably replace the use of strychnine within the next few years.

Table 3 TOXICANTS AND DEVICES DISTRIBUTED FOR COYOTE CONTROL

Year	Cyanide Shells	Strychnine Cubes	Single Dose 1080	Large 1080 Baits	Snares
1983	1,278	3,593	--	16	--
1984	1,175	4,184	147	15	--
1985	873	2,609	346	16	--
1986	482	2,166	558	8	141

The number of cases of coyote predation handled by Agricultural Fieldmen remained about the same during 1984 and 1985 and declined in 1986. Toxicant use has been decreasing because fewer toxicants were issued per case (Table 4). This is a very positive change because toxicants are being used with more discretion, without reducing the effectiveness of the program.

Table 4. TOXICANTS ISSUED FOR COYOTE CONTROL BY AGRICULTURAL FIELDMEN

	Number of		
Year	Cases	Toxicants Issued	Toxicants Per Case
1984	520	4,125	7.9
1985	528	2,933	5.6
1986	398	1,945	4.9

Eight 1080 baits were set in the M.D. of Cardston during the winter of 1986/87. These baits were set to remove coyotes near sheep farms with a history of coyote predation. Cardston is the primary sheep producing area in Alberta.

Permanent wildlife staff investigated 241 cases of predation during 1986, most of which involved coyote predation of sheep and calves. In addition, personnel were hired on a daily basis as required to assist agricultural fieldmen with coyote control; these temporary staff investigated 63 cases of depredation (Table 5).

Table 5. NUMBER OF CASES OF PREDATION INVESTIGATED BY PROBLEM WILDLIFE STAFF, 1985

	Prey					
Predator	Sheep	Cattle	Hogs	Poultry	Other	Totals
Coyote	141	84	2	29	2	258
Dog	20	5	0	1	0	26
Wolf	2	1	1	0	0	4
Bear	1	2	0	0	0	3
Other	0	1	0	12	0	13
Totals	164	93	3	42	2	304

Pesticide Issues

The Pesticide Issues Coordinator distributed staff guidelines for handling major pesticide issues within the province. These guidelines were designed to aid in speedy resolution of issues.

He co-ordinated the preparation and printing of a pamphlet describing safe handling and laundering of pesticide contaminated clothing.

The Pesticide Issues Coordinator, together with Dr. Ken Yoshida, University of Calgary, initiated and carried out a study to determine the effects on farmers of applying Furadan for grasshopper control.

He represented the Department on CAPCO (Canadian Association of Pest Control Officers) and delivered contributions regarding pesticide concerns to federal, provincial and interdepartmental committees.

A text book was prepared and printed, "Pest Control in Canada". It was designed to be used with the Ecology portion of the Biology 20 curriculum. The book also included a Teachers Guide which outlines how it may be used in conjunction with the Biology 20 text. Copies of this book were made available, free of charge, to students and teachers within the province.

Promotion of safe use of pesticides continued to be fostered through seminars and workshops delivered to farm groups and to Alberta Agriculture staff. Brochures, displays, stickers and slide kits were updated on a continuing basis to increase relevance and value to Alberta farmers.

On December 31, 1986, the Pesticide Issues Co-ordinator, Dr. Moe Hussain accepted a position with Environment Canada.

SOILS BRANCH

OBJECTIVES

1. To develop and promote improved soil management practices to increase crop productivity, farm income and prevent soil degradation.

2. To conduct research in the areas of i) soil fertility and fertilizers (i.e. fertilizer requirements for maximum economic yield), ii) management of normal and problem soils (i.e., acidic, solonetzic, organic), and iii) soil, plant and feed diagnosis and testing.

3. To transfer research technology to the farming public through extension and demonstration programs.

4. To transfer research information to private sector laboratories, agencies and agri-business to ensure producers have access to the latest technology and recommendations.

5. To provide diagnostic and routine soils, plant and feed testing services for producers, staff and researchers.

PROGRAM SUMMARY

The branch provided extension, research and diagnostic programs through department staff and directly to producers. A high demand continued for information on more efficient fertilizer use as farmers seek methods of improving crop production efficiency to cope with very narrow cost/return margins.

Field research on dryland and irrigated crops provided new information for general and soil test recommendations on new crops and varieties. The branch considers fertilizer use efficiency as a high priority because of its influence on net returns in crop production. Fertilizer can represent as much as 30% of the cash input costs in crop production. Total fertilizer purchases in Alberta are about 300 million dollars. Fertilizer sales for the year ending June 30, 1986 decreased to 908,511 tonnes from 968,442 tonnes in 1985/86. Sales activities of non-traditional soil amendments, fertilizers and growth regulators was high. Many of these products were not registered under the Canada Fertilizer Act and had no proven benefits to increase production under Alberta conditions.

The Agricultural Lime Freight Assistance (ALFA) Program provided grants of over $315,000 in financial assistance to 69 applicants for 11,600 tonnes of lime or marl.

The Farm Fertilizer Price Protection Plan announced on April 1, 1985 provided grants to farmers to reduce the cost of farm inputs. Payment was based on $50.00 per tonne of nitrogen (N) and $25.00 per tonne of phosphate ($P_2 0_5$). The program was extended to July 31, 1987. During the second fiscal year, $17,606,351 was paid out on 788,661 tonnes of fertilizer to 27,647 applicants. This compared to $21,232,005 in grants paid on 942,865 tonnes of fertilizer in the first year. Since the start of the program 33,962 farmers have received $38.8 million in grants.

To increase emphasis on applied field research and laboratory analyses methodology, a re-organization of the branch became effective April 1, 1986. To more adequately reflect the laboratory's role, the Agricultural Soil and Feed Testing Laboratory was renamed the Agricultural Soils and Animal Nutrition Laboratory.

Soil, plant and animal feed analyses and recommendations were provided to farmers on a fee basis and to researchers and department staff on a non-fee basis for diagnostic purposes or as our contribution to crops and animal research. Total soil, plant and animal feed sample receipts were 33,043 compared to 37,389 last year. The decrease was largely with plant and feed research samples and farm soils samples.

ACTIVITIES

The branch continued to meet the demands of the farming public for information on fertilizer use, and management of normal and problem soils. This was done through preparation of factsheets, short courses, crop production seminars and the other media forms. Branch programs were developed to meet increased farmer demand for management alternatives to improve problem soils such as solonetzic, acidic, organic and luvisolic soils.

The reorganization of the branch to increase emphasis on applied field research and laboratory analysis methodology became effective on April 1, 1986. Four positions were transferred from the laboratory. Mr. J.A. Carson retired in May following twenty years with the laboratory.

a) AGRICULTURAL LIME FREIGHT ASSISTANCE (ALFA) PROGRAM

This program which provides transportation assistance to farmers for liming acid soils, has been in operation since 1981. A lime requirement test is used qualify grants of 80 percent of the transportation costs above $5.50 per tonne of liming material.

Grants of $$315,164 were paid in 1986/87 to 69 applicants for the transport of 11,607 tonnes of lime and marl. A summary of the program since 1981 is provided in Table 1.

TABLE 1. AGRICULTURAL LIME FREIGHT ASSISTANCE PROGRAM - SUMMARY

	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87
Number of applicants	62	92	149	81	87	69
Total grants ($)	150,994	349,363	645,359	302,743	335,039	315,164
Number of tonnes	4,514	11,289	21,487	11,493	12,275	11,606
Average grant per tonne ($)	33	31	30	26	27	27
Average grant per applicant ($)	2,435	3,797	4,331	$3,738	3,851	4,568

b) ALBERTA FARM FERTILIZER PRICE PROTECTION PLAN (AFFPPP)

The purpose of the program was to assist Alberta farmers to reduce crop production costs particularly in reference to the current cost-price squeeze. Fertilizer can represent as much as 30 percent of the cash costs of crop production. The program was announced on April 1, 1985.

The program provided a grant to farmers on fertilizer used for crop production on land farmed in Alberta. Payment was based on $50.00 per tonne of nitrogen and $25.00 per tonne of phosphate. The present program was in effect from August 1, 1984 and will continue until July 31, 1987.

During 1986/87 total grants of $17,606,351 were paid on 788,661 tonnes of fertilizer purchased. Grants were paid on 27,647 applicants resulting in an average grant per applicant of $637. Under the program announced in April 1985, a total of $38,838,356 was paid to 33,962 farmers for an average of $1,144 per farm.

c) SOIL PRODUCTIVITY AND FERTILIZER USE

Extension and applied research related to soil and fertilizer management were the main activities. Extension meetings with farmers and fertilizer dealers and in-service training seminars with staff focused on improving production efficiency to cope with narrow cost/return margins. Fertilizer use efficiency and the effects of reducing inputs on unit costs of production ($/ha) were some of the key issues in the extension programs.

Interest in Intensive Crop Management (ICM) or management systems for Maximum Economic Yield (MEY) has developed rapidly. Staff were involved in the development and preparation of a Plant Industry Division report on ICM and in field research programs to develop soil and crop management practises to achieve maximum economic yield.

The highest level of fertilizer sales in Alberta (968,442 tonnes) occurred in 1984-85. In 1985-86, lower crop prices caused a decrease in fertilizer sales. Nitrogen and phosphorus use decreased by 7% and 10% respectively. There was also a moderate decrease in fertilizer prices.

Sale activities of non-traditional soil amendments, fertilizers, and growth regulators continued to be high. Some products are not registered under the Canada Fertilizers Act. The value of these products in increasing crop production under western Canadian conditions remains a concern.

Field research was conducted on both dryland and irrigated crops to provide soil test calibration data for new crops and varieties, and to evaluate fertilizer materials and methods of application. Increasing fertilizer use efficiency is a high priority because of the influence of fertilizer on net returns from crop production. Research was initiated to develop fertilizer and other management recommendation for maximum economic yield.

TABLE 2. FERTILIZER SALES IN ALBERTA

(By Analysis and Nutrient Content)

JULY 1 - JUNE 30

(Metric Tonnes)

FERTILIZER	1982-83[1]	1983-84[1]	1984-85[3]	1985-86[3]
82-0-0 (Anhy. Amm.)	163,650	187,337	187,382	174,631
46-0-0 (Urea)	187,226	226,243	245,123	221,875
34-0-0 (Amm. NO_3)	98,658	75,811	85,816	86,330
21-0-0 (Amm. SO_4)	19,096	16,757	27,215	30,790
28-0-0 (N. Soln.)	28,255	30,948	11,374	12,307
Other N	2,301	3,603	--	--
23-23-0	--	--	--	--
27-14-0	--	--	--	--
Urea Phosphates	--	--	20,687	17,622
11-48-0	--	--	--	--
11-51-0	287,066	308,149	311,497	276,149
11-55-0	--	--	--	--
Other MAP	--	5,377	--	--
18-46-0	--	207	168	22
16-20-0	21,299	20,888	21,338	28,851
10-34-0 (Soln.)	2,894	3,606	1,551	13,734
0-0-60 (KCL)	34,826	40,313	44,951	46,200
Others	10,289	908	11,340	--
Mixed (N/P/K)	--	--	--	--
Elemental S	--	4,341	--	--
TOTAL	855,560	924,488	968,442	908,511
Nitrogen (N)	303,815	335,906	352,907	329,772
Phosphorus (P_2O_5)	152,294	166,831	170,943	153,533
Potassium (K_2O)	21,267	24,900	27,420	28,182
Sulphur	7,842	7,191	--	--
Ag. Lime[2]	16,138	23,060	10,242	11,853

[1] Source: Western Canada Fertilizer Association, Calgary.

[2] Source: Alberta Agriculture, Edmonton

[3] Source: Canadian Fertilizer Institute, Ottawa.

Variability in fertilizer recommendations provided by various soil testing laboratories continued to be of concern. Potassium, sulphur and micronutrient recommendations were made in areas where research indicates little or no need. Branch staff provided information in the form of soil test procedure manuals and recommendations based on Alberta research.

d) Field Research

i) Southern Alberta

Irrigated Crops - Two major plot sites were established, one at Lethbridge and the other at Bow Island. Fertilizer response testing was conducted with 12 crops including soft wheat, hard wheat, HY-320, barley, durum wheat, canola, flax, peas, beans, sunflowers, grain corn and silage corn at each site. Preliminary fertilizer response curves were developed based on the past five years of data for the small grains and oilseed crops. A Farming for the Future grant provided additional funding for the small grain and oilseed work.

Four intensive crop management (I.C.M.) experiments were established at each site with Galt barley, Samson barley, Fielder soft wheat and HY-320 being the crops under study. The work was partly funded by a Farming for the Future grant with Doug Penney as project manager.

Two experiments were established to compare analyses and recommendations of soil testing laboratories in Alberta. The comparisons were made with soft wheat and barley and showed some improvement over last year.

Dryland Crops - Sites were established at Lethbridge and Pincher Creek. Four crops were grown at Pincher Creek: hard wheat, HY-320, barley and canola; and five crops at Lethbridge: winter wheat, hard wheat, barley, durum and HY-320. Yields were generally good, however, response to fertilizers was limited because of high residual levels of soil nutrients, resulting from the droughts of 1984 and 1985.

ii) Central and Northern Alberta

Field research was conducted at 17 locations utilizing randomized replicated experiments to measure yield and quality of crops with treatments involving fertilizers, soil amendments, varieties, growth regulators and fungicides. A total of 2,000 individual plots or treatments were seeded, monitored and harvested for yield and quality determinations. Soil nutrients, physical properties, soil moisture and precipitation are determined at each location.

Potassium experiments were continued at 3 locations for the fifth and final year. The assessment of residual response to K fertilizers was a key component of the study. The last two years of data are critical for maximum profit and for calibrating soil tests.

Response of barley and canola varieties to fertilizers was measured at four locations. This was the third year of a three year study which had determined that fertilizer requirements are more closely related to crop yield than to variety. A key component of improving fertilizer recommendation for maximum economic yield is a reliable estimate of yield potential based on soil-climatic parameters.

Other experiments involved the evaluation of sources and rates of lime. One experiment continues to show response to lime 16 years after application.

Intensive Crop Management (ICM) experiments were conducted with two varieties of barley and wheat at two locations. Treatment involved the evaluation of fertilizers, plant population, a growth regulator to control lodging and foliar fungicide for disease control. A minimum of 3 to 5 years will be required to evaluate the various components of I.C.M. The program will be continued and expanded in 1987 with funding from Farming For the Future.

e) PROBLEM SOIL MANAGEMENT

Management of problem soils including acid, solonetzic, luvisolic and organic soils were under investigation. The main activities were extension and applied research which included participating at producer meetings, preparation of factsheets, assessing research needs, establishing and maintaining research trials, and liaison with industry, local government and farm organizations.

i) Acid Soils

A trial established to compare calcium carbonate, calcium oxide, and marl has shown no significant difference among these liming materials as determined by crop yield. Soil tests have shown calcium oxide and marl react faster than calcium carbonate. Another trial established to compare liming to various pH levels has shown no effect on barley by liming above soil pH 6.5.

ii) Solonetzic Soils

Deep plowing and deep ripping or subsoiling were investigated for the improvement of solonetzic soils. Forty-eight sites were monitored to determine crop response to various treatments. Wheat response to deep plowing and ripping in 1986 is shown Table 3.

TABLE 3. WHEAT RESPONSE TO DEEP PLOWING AND RIPPING BY SOIL ZONE (bu/ac.)

SOIL ZONE	DEEP PLOW	RIPPER
Brown	4.5 (2)*	1.6 (1)*
Dark Brown	6.1 (4)	7.2 (6)
Thin Black	10.2 (3)	7.0 (3)
Gray	-	1.5 (1)

* ( ) represents number of sites

Trials evaluating the use of gypsum as a calcium source on solonetzic soils have shown an increase in crop yield. Further research is necessary to: (a) identify the soils most likely to respond to gypsum, (b) determine the amount of gypsum required and (c) determine crop response.

A cooperative research project involving the Soil and Crops sub-station, Agriculture Canada at Vegreville was initiated to measure the physical and chemical changes occurring in deep plowed soils at three sites. Preliminary soil test results showed significant differences in soil pH and the soluble cations (calcium, magnesium, potassium and sodium).

Twenty-five deep tillage plot sites were sampled to determine the effect of deep plowing and ripping on soil pH and percent clay in the topsoil. The results presented in Table 4 show that deep plowing (to 60 cm) changes the chemical and physical characteristics of soils considerably more than deep ripping because of increased soil mixing.

Table 4. EFFECT OF DEEP PLOWING AND RIPPING ON SOIL pH AND PERCENT CLAY

	Check	Deep Plowed	Ripped
Average pH	6.1	7.1	6.3
Range	5.1 to 7.1	6.3 to 8.1	5.6 to 8.0
Increase in Clay (%)	-	6.0	1.0
Range	-	0 to 10	-4 to 7

iii) Luvisolic Soils

In some luvisolic soils, a textural hardpan may be limiting water and root penetration of the subsoil. Wheat, barley and oat response to subsoiling averaged 1.5, 7.7 and 19.0 bu/ac respectively. However, at two sites at Mayerthorpe, barley yields were 5.8 bu/ac less on the subsoiled plot. The differring results cannot be explained at this time.

iv) Organic Soils

A project to assess deep plowing as a technique for improving crop production on organic soils was initiated. The plowing brings to the surface some of the mineral soil underlying the organic material. One site was established in the County of Barrhead and two were deep plowed in the Municipal District of Westlock. Crop response will be monitored to evaluate improvement in crop growth and to provide guidelines for identifying soils suited for deep plowing.

Further research is planned to determine the adaption of forage and cereal species and cultivars for growth on organic soils. Current laboratory techniques for analyzing organic soils and correlating soil test results with crop responses to determine nutrient recommendations is under investigation.

f) LABORATORY SERVICES

The Agricultural Soil and Feed Testing Laboratory was renamed the Agricultural Soils and Animal Nutrition Laboratory to more adequately reflect the changed role of the laboratory. There was greater emphasis on diagnostic analyses, methodology research and transfer of laboratory technology to private sector laboratories. This was to assure the farming public of reliable services. In line with these changes four laboratory positions were transferred to field research and extension.

The laboratory has the following purposes:

- To provide diagnostic and investigational services for Alberta Agriculture for special soil, crop and animal feed problems;
- To identify major problems in Alberta soils, crops and animal production, and where possible, initiate or conduct applied research projects to solve them;
- To compile and summarize analytical data for extension, scientific and diagnostic use;
- To provide an advisory and consultant service to private sector and other laboratories regarding analytical procedures, methodology and interpretive criteria for analytical data; and
- To provide an analysis and recommendation service to the general public on a fee basis for soils, crops and animal feeds.

i) Analyses Services

Tables 5 and 6 show that during the fiscal year 1986-87 the laboratory received a total of 19,353 soils and 13,690 plant and feed material samples.

Of the 19,353 soil samples 3,657 or 19% were producer related, 9,898 or 51% were from research projects and 5,798 or 30% were submitted for demonstration/diagnostic, garden or greenhouse purposes.

Of the 13,690 plant and feed materials samples 3,359 or 25% were producer related, 7,316 or 53% were from research projects and 3,015 or 22% were submitted for demonstration/diagnostic purposes.

TABLE 5. PRODUCER, RESEARCH AND OTHER (DEMONSTRATION/DIAGNOSTIC, GARDEN, GREENHOUSE) SOIL SAMPLES RECEIVED AND AS PERCENTAGES OF TOTAL SOIL SAMPLES FOR SPECIFIED PERIODS.

	Soils			
Period	Producer (%)	Research (%)	Other (%)	Totals
1983-84	10,216 (37.4)	11,944 (43.7)	5,167 (18.9)	27,327
1984-85	6,226 (27.7)	11,773 (52.3)	4,491 (20.0)	22,490
1985-86	5,576 (27.5)	9,737 (47.9)	5,004 (24.6)	20,317
1986-87	3,657 (18.9)	9,898 (51.1)	5,798 (30.0)	19,353

TABLE 6. PRODUCER RESEARCH AND DEMONSTRATION/DIAGNOSTIC PLANT AND FEED MATERIALS SAMPLES RECEIVED AND AS PERCENTAGES OF TOTAL PLANT AND FEED MATERIALS SAMPLES FOR SPECIFIED PERIODS.

	Plant and Feed Materials			
Period	Producer (%)	Research (%)	Demonstration/ Diagnostic (%)	Totals
1983-84	4,225 (20.1)	14,543 (69.1)	2,268 (10.8)	21,036
1984-85	5,083 (24.8)	12,763 (62.3)	2,637 (12.9)	20,483
1985-86	3,592 (21.0)	11,129 (65.2)	2,351 (13.8)	17,072
1986-87	3,359 (24.5)	7,316 (53.4)	3,015 (22.1)	13,690

Comparison of the 1986-87 data with the corresponding data for the three previous fiscal years shows a marked decline in producer and research submissions for both soils and plant and feed materials. The demonstration/diagnostic categories show the reverse trend with an overall increase in numbers.

The implementation of an ion chromatograph analyses system and the development of microwave digestion has enabled accurate analyses of mineral feed supplements. Service to greenhouse specialists and growers has been markedly improved with the introduction of a new extraction procedure enabling more rapid turn-around service.

A wide range of analyses shown in Tables 7 and 8 are evidence of laboratory capability.

TABLE 7. THE NUMBER AND TYPES OF NON-ROUTINE MINERAL ANALYSES ON PRODUCER, RESEARCH AND OTHER (DEMONSTRATION/DIAGNOSTIC, GARDEN AND GREENHOUSE) SOIL SAMPLES FOR THE SPECIFIED PERIODS.

	1984-85			1985-86			1986-87		
Minerals	Producer	Research	Other	Producer	Research	Other	Producer	Research	Other
Sodium (Na)	5	90	68	0	99	121	1	2,126	277
Magnesium (Mg)	49	308	68	4	174	122	126	1,192	280
Selenium (Se)	1	0	0	0	0	0	0	0	0
Iron (Fe)	136	706	142	314	667	399	98	1,801	427
Manganese (Mn)	207	768	166	45	667	394	96	1,967	407
Copper (Cu)	110	706	112	55	667	294	90	1,871	337
Zinc (Zn)	240	853	112	38	667	294	74	1,865	320
Boron (B)	97	452	109	32	146	234	14	1,088	172
Molybdenum (Mo)	51	126	4	0	0	92	6	0	95
Aluminum (Al)	269	124	57	270	0	105	10	144	59
Cobalt (Co)	0	0	0	0	0	11	0	0	0
Nickel (Ni)	0	0	0	0	0	11	0	0	0
Cadmium (Cd)	0	0	0	0	0	11	0	0	0
Lead (Pb)	0	0	0	0	0	11	0	0	0
Chromium (Cr)	0	0	0	0	0	11	0	0	0
Arsenic (As)	0	0	0	0	0	11	0	0	0
Barium (Ba)	0	0	0	0	0	11	0	0	0
Strontium (Sr)	0	0	0	0	0	11	0	0	0
Vanadium (V)	0	0	0	0	0	11	0	0	0
Titanium (Ti)	0	0	0	0	0	11	0	0	0
Category Totals	1,165	4,133	838	758	3,087	2,165	515	12,054	2,374
Annual Totals		6,136			6,010			14,943	

TABLE 8. THE NUMBER AND TYPES OF NON-ROUTINE MINERAL ANALYSES ON PRODUCER, RESEARCH AND DEMONSTRATION/DIAGNOSTIC, PLANT AND FEED MATERIALS SAMPLES FOR THE SPECIFIED PERIODS.

Minerals	1984-85			1985-86			1986-87		
	Producer	Research	Demo/ Diag	Producer	Research	Demo/ Diag	Producer	Research	Demo/ Diag
Sodium (Na)	1	2	39	0	367	55	0	178	46
Potassium (K)	206	769	190	159	1,033	253	208	1,209	333
Magnesium (Mg)	222	769	231	364	839	274	326	816	365
Sulphur (S)	162	769	157	172	817	246	185	1,100	332
Selenium (Se)	873	41	657	760	412	746	957	404	981
Iron (Fe)	67	652	132	0	902	260	17	739	113
Manganese (Mn)	338	687	463	253	947	546	309	1,388	533
Copper (Cu)	375	687	599	315	947	676	405	1,388	875
Zinc (Zn)	370	687	600	308	947	677	388	1,355	839
Boron (B)	8	631	66	2	374	106	0	531	25
Molybdenum (Mo)	87	468	14	61	570	129	114	300	39
Aluminum (Al)	5	2	39	0	0	25	12	0	35
Cobalt (Co)	2	0	8	0	146	48	5	175	61
Nickel (Ni)	60	0	7	0	0	4	0	0	29
Cadmium (Cd)	60	0	5	0	0	14	0	0	35
Lead (Pb)	56	0	6	0	0	0	0	0	28
Chromium (Cr)	4	0	0	0	0	0	0	0	13
Arsenic (As)	0	0	6	0	0	4	0	0	26
Barium (Ba)	0	0	2	0	0	0	0	0	13
Strontium (Sr)	0	0	4	0	0	0	0	0	0
Titanium (Ti)									
Category Totals	2,896	6,164	3,225	2,394	8,301	4,063	2,926	9,583	4,721
Annual Totals		12,285			14,758			17,230	

TABLE 9. SUMMARY OF SUBMITTERS AND THEIR USE OF THE DEMONSTRATION/ DIAGNOSTIC SERVICES FOR 1986-87

Submitter	% of Total Submissions	
	Soils	Plant and Feed Materials
1. District Agriculturists/Fieldmen	22	45
2. Regional and other Specialists	29	19
3. Headquarters Specialists	20	2
4. Laboratory Staff	29	34
Total Samples	3,357	3,015
Number of Reports	599	868

ii) Demonstration/Diagnostic Services

With reference to Tables 5 and 6 demonstration/diagnostic samples have increased during the past three fiscal years. Table 9 provides a summary of submitters and use of services for 1986-87. District agriculturists and fieldmen were the major users of plant and feed materials with 45% of the submissions. There was a more even distribution among the four categories of submitters in the case of soils.

iii) Research Services

The research program was designed to assist soils, crops and animal specialists and other researchers on a project basis. In this program applications for research project analyses were evaluated and acceptance was based on the project meeting established objectives and the capability of the laboratory to conduct analyses requested. Table 10 lists the research projects for the 1986-87 program. There were 41 projects with the majority (61%) from Alberta Agriculture, 22% were from Agriculture Canada, 12% from the University of Alberta and 5% from private industry and other agencies.

These projects yielded valuable base data for a wide range of provincial applications which include:

- soil and crop management practices
- updating soil analysis recommendations programs
- organic soil characterization and fertility requirements
- animal feeds quality and evaluation
- animal feeding management practices.

iv) Laboratory Data Management

A private consultant was contracted by the Systems Development Branch to develop a computerized system for managing laboratory data, and providing agricultural soil test recommendations for making cropping and fertilizer decisions in Alberta. The development of this system was completed in early 1987 and will be tested and modified with expected full use by mid 1987.

Summaries of routine and research analysis results were accumulated and stored by the laboratory. Substantial use was made of the government computing facilities for data analysis by the laboratory. This included:

- development and testing of a model for crop response to fertilizer nitrogen and available moisture for both irrigated and non-irrigated crops. The model will be incorporated as part of the soil test recommendation portion of the Laboratory Data Management System.
- fall soil test nitrogen levels.
- analysis and summary of the Breton Field data stored in the Alberta Soil Information System (AltaSIS). This is a cooperative project between the Soils Science Department of the University of Alberta, and the Soils Branch of Alberta Agriculture.

TABLE 10. SUMMARY - 1986 RESEARCH PROJECT ANALYSIS PROGRAM

Project Number	Name of Researcher and Project Title	Sample Volume Soils	 Plants and Feeds
86-001	Dave Plett, U. of A. Feeding quality of frost damaged and sprouted barley	-	104
86-002	Alex Hawley/R. Judd Bunnage, A.D.A. Wapiti selection of forage species potentially used in reclamation	-	193
86-005	Rob Hand, A.D.A. Feed survey of Zigihar Range Improvement Area	-	33
86-006	Garry R. Coy, A.D.A. Long term effects of management on soils and crop yields	210	40
86-007	Garry R. Coy/Peter Polukoshko A.D.A. Nitrogen application comparisons	63	-
86-009	Garry R. Coy, A.D.A. Soil properties for cropping	48	-
86-010	Garry R. Coy, A.D.A. Crop response to balance fertility	63	-
86-011	Ross McKenzie, A.D.A. Soil phosphorus study	451	-
86-012	Clive Schaupmeyer, A.D.A. Influence of nitrogen levels on maturity, yield, specific gravity and quality of processing potatoes in southern Alberta	334	83
86-013	Dale F. Engstrom/W.I. Irvine, A.D.A. Quality of pasture on Peace River grazing reserves	-	100
86-014	Ross McKenzie, A.D.A. Development of irrigated and dryland fertilizer recommendations	566	3789
86-015	David Sippell, A.D.A. Epidemiology of canola root rot	54	36
86-016	Jerome Lickacz, A.D.A. Solonetzic soil deep tillage feasibility study	263	109

TABLE 10. SUMMARY - 1986 RESEARCH PROJECT ANALYSIS PROGRAM (Continued)

Project Number	Name of Researcher and Project Title	Sample Volume Soils	 Plants and Feeds
86-017	Rick Sherstebetoff, A.D.A. Peat soil management research	325	-
86-018	G.W. Mathison, U. of A. Ruminant feed evaluation unit	-	147
86-019	Rick Courtney, U. of Calgary The effects of burning on Pronghorn range quality	-	36
86-020	Jerome Lickacz, A.D.A. Liming Acid Soils	495	128
86-021	Tom Jensen, A.D.A. Legume green manuring	39	51
86-022	R.C. McKenzie, A.D.A. Moisture & Nitrogen storage in fallow and stubble	300	-
86-023	R.C. McKenzie, A.D.A. Winter wheat production as a means of reducing summerfallow	31	-
86-024	R.C. McKenzie, A.D.A. Water use of hay alfalfa and wheat in northern Alberta	36	36
86-025	R.C. McKenzie, A.D.A. Intensive management of wheat	47	84
86-027	L.J. Piening/S.S. Malhi, C.D.A. The effect of copper on stem melanosis of Park and other wheat cultivars	504	225
86-028	S.S. Malhi, C.D.A. Increasing efficiency of fall-applied N under various tillage and straw management system	1,336	-
86-030	S.S. Malhi, C.D.A. Feasibility of winter cereals in central Alberta	54	-
86-034	Richard Pearen, C.D.A. Nitrogen response curve and nitrogen fertilizer management for meadow bromegrass in Alberta	150	-

TABLE 10. SUMMARY - 1986 RESEARCH PROJECT ANALYSIS PROGRAM (Continued)

Project Number	Name of Researcher and Project Title	Sample Volume Soils	Sample Volume Plants and Feeds
86-035	Darryl Wells, A.D.A. 1986 A.S.B. cereals & oilseeds, and forage applied research & extension project	12	130
86-036	Doug Penney, A.D.A. Intensive crop management (ICM)	80	384
86-037	Doug Penney/Don Laverty, A.D.A. Evaluation of elemental S fertilizer	112	64
86-038	Doug Penney, A.D.A. Soil test calibration for barley and canola varieties	64	702
86-039	Doug Penney/Ed Redshaw, A.D.A. Cu and Mn requirements of organic soils	-	69
86-040	J.A. Robertson, U. of A. Recovery of residual potassium from previous high plowdown application	166	-
86-041	J.A. Robertson, U. of A. The Breton plots, long term effects of cropping systems and fertilizer applications on luvisolic soils	104	-
86-042	J. Harapiak/N. Flore, W.C.F.L. Long term fertilizer use and soil properties	804	-
86-043	J. A. Robertson, U. of A. Residual effects of previously applied P fertilizer	276	-
86-046	Henry Najda, C.D.A. Rates of fertilizer application and effect on grass seed production	288	-
86-047	Ross H. McKenzie, A.D.A. Development of irrigated and dryland fertilizer recommendations	774	-
86-048	Dr. Y. Soon, C.D.A. Beaverlodge rotations	15	-
86-049	Dr. Y. Soon, C.D.A. Straw management on luvisolic soils	96	-

TABLE 10. SUMMARY - 1986 RESEARCH PROJECT ANALYSIS PROGRAM (Continued)

Project Number	Name of Researcher and Project Title	Sample Volume	
		Soils	Plants and Feeds
86-050	Dr. Y. Soon, C.D.A. Crop rotation - mountain trail farm	40	-
86-051	Wayne Lindwall, C.D.A. Evaluation of development of furrow openers for seed and fertilizer	456	-
	Total	9,825	6,543

FIELD CROPS BRANCH

OBJECTIVES

- 1. To develop new, high yielding varieties of barley, winter wheat, winter and spring triticale adaptable to Alberta.

- 2. To obtain performance and adaptability information on new and recommended cultivars of barley, wheat, oats, canola and flax.

- 3. To evaluate varieties and agronomic practices of barley, wheat and triticale for high moisture grain production.

- 4. To promote adoption of varieties and management practices to improve cereal and oilseed production in Alberta.

- 5. To provide seed technology to improve pedigreed seed production.

- 6. To promote adoption of forage varieties and management practices on rangeland and tame forage crops to improve forage production in Alberta.

- 7. To study the economic and agronomic advantages of special (alternative) crops in Alberta and to obtain performance and adaptability information on possible alternate crops, in order to make variety and production recommendations. To develop the agronomic technology necessary to produce viable seed from alternate crops.

- 8. To administer the guidelines for assistance to the Municipal Co-op Seed Cleaning Plants in Alberta.

- 9. To provide assistance to other sectors of the Department, agencies, and the agricultural industry.

PROGRAM SUMMARIES

The research section obtained registration of a new 6 row feed barley "Noble" (BT518) and a new spring Triticale "Wapiti" (T44). Breeder seed of these new varieties will be issued to select seed growers in the spring of 1987.
The 135 acres purchased in 1986 adjacent to our research farm has been land-levelled, roads built with drainage construction and fence line clearing underway. We will now have a combined area of approximately 400 acres research land.

The winter nurseries were continued in California and Oregon.

Studies on I.C.M. were established. Dry spring and wet harvest adversely affected results.

A new "Oat Production" manual was produced and published.

77 municipal co-operative seed plants processed 26 million bushels of cereal and oilseeds. This was decrease of 1.3 million bushels from the previous year.

40 seed plants received Provincial grants totalling $522,137.00 (40%). The average grant was $13,053.00. 3 new plants (replacement) were established at Stony Plain, Carstairs and Dawson Creek. Average cost was $1.3 million.

25 "Grow-with-Canola" on farm demonstration sites clearly showed a 25% increase in yield is obtainable through management changes in agronomic inputs.

Resource staff participated in a departmental task force to develop a proposal on intensive crop management/maximum economic crop yield.

237,130 acres of pedigreed seed were grown by 1,078 growers in Alberta. We conducted the annual seed technology school for the seed industry.

Special crops continue to increase. We saw an increase of 84,000 acres in 10 crop kinds this year.

4 test sites in central Alberta were established by a Farming-for-the Future grant to conduct agronomic research on Special Crops.

9 Forage Associations continue to increase regional awareness of the value of forages.

Forage seed production continues to draw interest with price increasing due to increased interest in soil conservation and export demand especially for crop diversion programs in the U.S.A.

All resource staff were involved in a heavy load of producer meetings throughout the Province as every effort is being made to reduce crop input costs.

The branch participated in a range improvement project in the Qiqihar Range in Heilongjiang Province in northern China.

35 test sites were operated throughout the Province to evaluate licensed varieties of cereals and oilseeds.

a) CEREAL CROPS

The publication 'Varieties of Cereal and Oilseed Crops for Alberta' was revised, updated and distributed through the "Country Guide" and District Offices. The information presented in this publication is based upon our extensive regional variety testing program to aid farmers in selecting the most suitable varieties for their areas.

A manual entitled "Oat Production in Alberta" was prepared and published. The manual contains the latest information on the production practice to maximize economic yield.

The major extension demand this year was on barley, winter wheat, hard red spring wheat and semi-dwarf wheat and barley production. Interest has increased utilizing more cash inputs for the greatest economic return.

i. MUNICIPAL CO-OPERATIVE SEED CLEANING PLANTS

Seventy-seven municipal co-operative seed cleaning plants processed 25.7 million bushels of cereal grain and oilseeds for the year ending June 30, 1986. This amount was down 1.3 million bushels from last year, and 3.7 million bushels below the five-year average.

The following table shows the amount of seed processed in 1986.

General Summary (Bushels)	1986
Total cleaned for Commercial Seed	23,522,977
Total cleaned for Pedigreed Seed	1,219,238
Total cleaned for Seed	24,742,215
Total cleaned for Dockage Removal	950,856
TOTAL PROCESSED	25,693,071
Average grain processed per plant, 1986	334,000
Five-year average grain processed per plant	374,000

There were forty seed cleaning plant grant applications under the Upgrading Program. These forty totalled $1,327,462 expenditure by the plants, and $522,137 of provincial grant money. This compares to 50 grant applications totalling $1,460,240 of expenditure and $552,137 of provincial grant money last year. The average grant paid in 1986 was $13,053.43 compared to $11,055.34 paid last year.

Three new seed cleaning plants were completed in 1986-87 at Stony Plain, Carstairs and Dawson Creek averaging $1.3 million each. Wainwright plant underwent a large upgrading with over a quarter million dollars spent. Future plants planning on replacement are Willingdon in 1987-88, Rycroft in 1988-89, Three Hills in 1989-90 and Boyle in 1990-91. Our Provincial Replacement Program provides technical and financial assistance to these plants, each of which will cost about 1.1 to 1.3 million.

b) Oilseed Crops

Principle activities were directed towards technology transfer through production meetings, field tours, on-farm demonstrations, media releases, agronomic training seminars for industry field representatives and individual contacts. Numerous articles and materials were prepared and assembled for regional and district staff, educational institutes and commodity groups. Growers and industry were very supportive of these activities.

Direction and assistance was provided to the Canola Council of Canada's "Grow With Canola" program. Resource staff participated in the development of technology transfer materials and programs and as speakers at Grow with Canola seminars. Input and direction was provided to the planning and development of on-farm demonstrations throughout western Canada, handled by five Grow With Canola agronomists, two of which were located in Alberta. The agronomists developed 25 on-farm demonstration sites in Alberta with co-operating growers. The demonstrations clearly illustrated that 25 percent yield increases were obtainable through management changes in agronomic inputs over the normal production practices of the co-operating growers. These on-farm demonstrations were viewed by several thousand growers and industry people. Input and direction was provided to the Grow With Canola agronomic research projects which enhanced knowledge on sclerotinia stem rot and blackleg disease control, management practices effects on low temperature germination, crop fertility, weed control, tillage and seedling practices.

Input, direction and assistance was provided to various crop production clubs throughout the province. Growers in these clubs adopted more intensive management systems utilizing proven research technology and achieved higher yields with lower costs per unit of production compared to their normal production practices.

Close liaison was maintained with oilseed organizations, crushers and exporters to facilitate communications within the oilseed complex and provide resource information. Two Alberta Canola Industry meetings were held to discuss the common concerns of the canola industry with researchers, crushers, producers, seed growers, grain handlers and government.

Resource staff participated in the department's intensive crop management/maximum economic yield task force to develop an overall strategy of benefit to Alberta Crop producers. Studies were undertaken to determine the importance of each of the approximately 56 separate crop production factors that influence crop growth to develop a weighted multifactor system which could enhance decision - making in crop production.

Close liaison was maintained with Agriculture Canada regarding the Canada/Alberta Canola Breeding Project at Beaverlodge, Lethbridge and Saskatoon, as well as other Farming For The Future, Federal and University Oilseed Research projects. The Canola Breeding Project continues to develop progressively towards regionally suitable varieties for northern Alberta and for southern Alberta irrigation and dryland.

Resource staff participated in a mission to northern China to assist the Chinese in the production of Canadian Canola varieties. Other out-of-country project involvement was with the India/Canada Oilseed Agreement in which three India representatives studied Canadian soil analysis method for oilseed crops.

c) Forage Crops

Interest by producers in forage crop production remained high. The 9 forage associations continue to have strong local programs especially pasture projects. The Lakeland Forage Association sponsored the first hay auction in Alberta with hay sold on the basis of scale weights, and nutrient analysis including protein and digestibility.

The Alberta Forage Institutes became more active. This organization hired a part time manager to coordinate forage activities and promote greater awareness and understanding between associations and the Alberta Forage Institute.

The Alberta Forage Seed Council completed its present three year mandate.

Hay and tame pasture production was much improved in 1986 compared to the previous three years. No agricultural area had serious deficiencies although there were localized shortages north of Medicine Hat. Continuous wet weather in July and again in September did lower the quality of hay. Winter 1986/87 was unusually mild and dry and this combined with readily available hay and feed grain made for inexpensive livestock feeding. Hay prices were the lowest for several years. i.e. in the $40-50 per tonne range for good quality hay.

Forage seed production also recovered well in 1986. Alfalfa seed production was somewhat less (i.e. 2.5 mil kg) mainly due to adverse weather conditions at harvesting time. Red clover seed acreage and yield was increased over 1985 but still below the average of recent years.

Alsike clover seed production was increased due to higher acreages (2.0 mil kg.) Sweet clover seed production nearly doubled to 0.2 mil kg. All clover prices were good especially sweet and red clover.

Bromegrass seed production remained at about 0.7 mil kg i.e. similar to 1985 but prices were strong. Timothy acreages were steady and yields were good giving in increased total production of about 1.4 mil kg.

Creeping red fescue seed production was about 4 mil kg up slightly from 1985.

Forage seed prices, especially for sweet clover, red clover, Bromegrass and other dryland grasses were strong due to increased forage plantings because of lower cereal and oilseed prices and the USA conservation programs.

A forage person was again included in the Quqihar Range Development Project for one month. Emphasis this year on pasture management and field establishment of forage crops. Canadian Bromegrass, Alfalfa and Clover varieties are doing especially well in Heilonjiang province.

Numerous press and radio releases were made including the following topics:

(1) Pasture Management
(2) Alfalfa Harvesting
(3) Seed Supplies
(4) Seed Mixtures for Planting
(5) Bromegrass
(6) Timothy
(7) Economics of Alfalfa

The following publications were prepared:

(1) Varieties of Annual Forages
(2) Pasture section of Cow-Calf Manual

d) Special Crops

Producer interest in special crops continued to increase during 1986. Acreages of 10 crop kinds increased by a total of 84,000 acres over 1985's acreage. Greatest interest was directed toward pulse crops, grain corn, sunflower and safflower. Dry field pea production will be a very attractive crop for Alberta growers in the future as export markets expand and because of an increased demand for domestically produced protein for livestock feed.

The second year of a pulse crop agronomic research program was completed at 4 sites in central Alberta in 1986. A final report for 2 years of research will be published early in 1987. Research and on farm demonstration continues at an accelerated rate from the north to the south under the direction of two special crops specialists and a research agronomist at AHRC.

This section continued to assist and advise key producer organizations during 1986. Producers and the trade have responded favorably to this input resulting in expansion in all facets of the industry.

e) Seed Technology

The Seed Industry experienced another complex year in 1986. Bumper crops were expected for all crop kinds. Early fall frosts and excessive moisture conditions took their toll in most regions of the province. Although there were quality and some initial germination problems, seed supplies for 1987 season appears more than adequate for most crops.

The Alberta Branch of the Canadian Seed Growers' Association sustained another gratifying year. Membership rose to 1,078 and inspected acres increased to 237,130.

Agriculture Canada is still pursuing their cost recovery concept. Inspection fees will increase to 35¢ per acre in 1987 and continue to increase 5¢ per year until 1990 to a total of 50¢ per acre. Increased costs for seed sealing are still being reviewed. The new Authorized Establishment manual is now in place. Implementation date of new Seeds Act and Regulations will be July 1, 1987.

The Alberta Stock Seed Distribution Committee reviewed approximately 70 applications in 1987. 50 of these applications were granted probationary status.

Membership in SeCan still remains strong with over 2,500 members. Alberta has 627 members. SeCan varieties accounted for about 65% of the inspected acreage. One successful regional SeCan meeting was held in the province.

Seed shows thru out the province were extremely successful. The major seed shows consist of Ag Expo in Lethbridge, Calgary Seed Fair and Hay Show, Grande Prairie Seed Show and the Northlands Pedigreed Seed Show. The producers are to be congratulated on their support of the shows, given the inclement harvesting conditions of 1986. The Canadian Seed Growers' Display was in attendance at these major shows as well as various other regional fairs thru out the province. Various Probationary/Select Workshops and field days were once again hosted by the Alberta Branch.

The Seed Technology Workshop, hosted by Olds College was again very well attended. We continue to draw 50-60 representatives from the Seed Industry in Western Canada.

The Alberta Branch of the Canadian Seed Growers' Association maintained liaison with the respective commodity groups and associations. Banff was the host site of the 1987 Annual Meeting which had 185 members and guests in attendance. The Alberta Branch participated in the Canadian Seed Growers Association, and the Canadian Seed Growers Association/Canadian Seed Trade Association Interprovincial Meeting.

The Canadian Forage Seed Project experienced an extremely busy year. Interest in forage seed for 1986 seeding was far beyond expectation. Applicants for forage seed in 1987 have even been stronger. This interest has resulted in inventories of varieties handled by the project being at an all time low. The province allocated 12,225 kg of Foundation Seed in 1986. Requests for foundation seed were greater than supplies.

Assistance was provided to all regional and district staff as required. This assistance was also made available to community groups, associations, Agriculture Canada, universities, colleges and the farming public.

(f) Range Management

The Range Management Sections' activities were directed toward extension of technology through publications, field tours, news articles and forage associations.

Extension activities included speaking at District Agriculturist and Forage Association field days. The Society for Range Management Alberta Tour was organized at the Canada Department of Agriculture's Range Station at Stavely, Alberta. A tour was held to view what thirty five years of different stocking rates could do to modify Alberta's foothills range land. The tour attracted over 200 people from Montana and Alberta.

The Suffield Grazing Advisory Committee recommended stocking rates for the military area at Suffield, Alberta for 1987.

A new grazing demonstration program at Brooks was started to demonstrate a complementary grazing system, while improving the waterfowl habitat. Ducks Unlimited, Alberta Wildlife and the Canadian Wildlife Federation purchased the 5,500 acre demonstration ranch to begin in 1987. It is called "Antelope Creek Habitat Development Area."

Production sector Regional Updates for District Agriculturists were conducted in Vermilion, Red Deer, Airdrie and Barrhead this year.

"Range its Nature and Use" was published by Public Lands this year. It is available at the Bramalea Building in Edmonton.

g) Crop Research

Dry springs and wet harvest periods have been a serious problem since 1984. Consequently production of good quality seed was difficult in 1986. In order to meet expected seed demands, large increases of Samson, Noble and Wapiti (Triticale) were grown out in 1986.

Improvements in disease resistance straw strength and maturity continued to be the major areas of emphasis in the two-rowed and six-rowed barley projects (normal and high lysine). The six-row barley BT518 was registered as Noble. Seven advanced lines are in advanced stages of testing in the barley cooperative trials for 1987.

The effort to produce a new semi-dwarf barley to replace Samson was intensified. Emphasis was placed on both 2 and 6 row semi-dwarf types and 85 new populations were created by crossing and increasing in California. Considerable selection pressure for leaf disease resistance and seed density is being applied to the semi-dwarf populations.

Work on the development of hulless barley's was greatly intensified in 1986. Special emphasis is being placed on reducing B-glucan content and increasing yield relative to the standard hulless cultivar Scout. The test line TR607 consistently outyields Scout by 20-40% and has a higher hectolitre weight. Ten advanced lines were grown out in increases for the evaluation of protein nutrition. A further 60 lines with high levels of lysine were subjected to further agronomic evaluation.

Land purchased in 1985 to cover the needs for expanded experimentation and breeder seed production was extensively worked. Land leveling and the layout of drainage and roadways was well underway by the end of the season.

Seed quality, sprouting resistance and days to maturity received the primary emphasis in the spring triticale hybridization program. Lines with improved test weights and lines with sprouting resistance similar to common wheat are presently in the advanced stages of testing and purification. A manuscript on sprouting resistance in spring triticale (the influence of Chaff Extracts on the Germination of Spring Triticale) was published in the Agronomy Journal in October 1986. A further manuscript on selection for improved seed quality is in preparation.

The high yielding seed and silage triticale line T44 was registered under the name "Wapiti". Seed increases were carried out at Lacombe, Olds and Drumheller in 1985 but due to early frost and adverse harvesting conditions which continued until late October, it was necessary to arrange a further increase in California. Seed growers have shown interest in this cultivar for the 1987 season.

Emphasis was increased in the winter cereal breeding projects during the 1985-86 season. Winter triticale lines with winter survival superior to the presently registered cultivars Wintri and Decade and at least equal to the best available wheats are in the advanced stages of evaluations. Populations with early maturity (10 days earlier than Norstar) are presently undergoing evaluation for winter survival.

A large number of on-going agronomic studies on Barley, spring triticale, and the winter cereals were carried out in 1086. The agronomy project continued support work on the evaluation of materials from the breeding projects for disease resistance. The addition of P_2O_5, KCL and K_2SO_5 resulted in increased barley yields in the presence of similar levels of root rot. The variability in root rot under field conditions is a major problem in determining yield losses due to this common disease.

Evaluation of barley and triticale advanced lines for silage was continued in 1986. The barley's tested averaged 7.7 tonnes per hectare, Oats 6.5 tonnes and the spring triticales averaged 8.0 tonnes per hectare. In contrast to where barley maximum yield occurred 3 weeks after heading triticale maximum yields occurred 4 weeks after heading.

The ICM studies were adversely influenced by the dry spring and wet harvest period. The barley varieties tested did not respond to differences in seeding density but Leduc, Johnston, Noble and Empress responded to fertility levels. The most responsive cultivars will be continued in the study.

An intensive management test in barley and wheat was run in cooperation with D. Penny with support from Farming for the Future. The results at Lacombe were very good in spite of the low level of fertility of the soil in the spring. Samson barley was higher yielding than Leduc at all levels of fertility, seeding rate, fungicide or PGR treatment. HY320 wheat was higher yielding than Oslo and Neepawa but was 16 days later maturing than Neepawa and 11 days later than Oslo.

The Farming for the Future study on cold hardiness in winter wheat and triticale was completed during the past season. It was apparent that winter triticale does not conform with standard techniques used in the evaluation of cold tolerance in winter wheat. Considerable work on the physiology of cold hardiness in winter triticale is required.

A more detailed annual report on the Cereal and Oilseed variety testing program and the Cereal Research program is available in the Agriculture Library in the J.G. O'Donoghue Building in Edmonton and the Field Crops Library in Lacombe.

ALBERTA TREE NURSERY AND HORTICULTURE CENTRE

The Alberta Tree Nursery and Horticulture Centre had a terrific year in 1986, meeting and outdoing its set objectives. Every facet of agricultural production in Alberta benefited from the very popular programs supplied by the branch in 1986.

The objectives of the branch are to 1) provide top quality shelterbelt trees for Alberta grain and livestock producers, 2) provide top quality trees for Arbor Day and for beautifying and producing instant provincial parks, 3) stimulate commercial horticulture agri-business, 4) provide aggressive leadership to commercial producers of greenhouse crops, vegetable crops and nursery crops by quality extension derived from production research, on-farm demonstrations and experience of the specialists, 5) provide extension information to amateur horticulturists and guidance to the member groups of the Alberta Horticulture Association and 6) to work closely with the groups that represent our commercial producers - Alberta Greenhouse Growers Association, Alberta Fresh Vegetable Marketing Board, Alberta Market Garden Association, and Landscape Alberta Nursery Trades Association.

Nursery Program Summary:

Wind blown fields, hog and poultry barns, feed lots, cow-calf producers and farmers homes in Alberta all benefited from the 2.4 million shelterbelt trees provided by the Centre in 1986. Barn and house heating costs go down, soil stays in the field and rates of gain will increase with cattle when shelterbelt trees are used properly. This program is very popular for economic and soil conservation reasons. Every county, M.D. and I.D. in Alberta received trees in 1986.

Along with shelterbelt trees, Alberta's urban population received 39,645 trees on Arbor Day to plant at home. This popular program is excellent in providing Alberta's young population with experience and pride in nature and agriculture. Alberta's Provincial Parks received 16,381 trees from the Nursery's container program to provide all Albertans with improved relaxation time.

Amateur Horticulture Summary:

An industry with 94 million in sales and a net worth of 1.9 billion dollars is big business for Alberta businessmen to take advantage of. During 1986, horticulture extension conducted a survey of private homes as part of a study to determine the economic value of horticulture in Alberta. The results indicated that the average homeowner spends over $230 per year on plants and their maintenance. Replacement value of existing plantings average over $4900 per yard (and then there's all the apartments!). To help the average Albertan spend this money wisely to get bountiful gardens, the horticulture program produced a video, made slide tape sets, put on courses for rural Albertans throughout the province, sent out Alberta Agriculture's most popular publication "Alberta Horticultural Guide" (43,000), worked with district extension offices, worked with 56 affiliated societies of the Alberta Horticultural Association and then found time to pick up the phone 12,142 times to answer questions.

Commercial Vegetable Summary:

The specialist's favorite saying is "for every vegetable grown and marketed in Alberta, one less dollar leaves Alberta". While most producers in Alberta try hard for exports to bring in money, this industry spends its time filling in for imports to keep the money here.

The commercial vegetable industry had a good year in 1986, thanks to good weather, good prices and good wide open marketing channels.

The program is responsible for the expansion of the industry in Alberta Agriculture Regions 3, 4, 5, and 6. The program centers itself on watching closely the crop unload reports to the wholesale trade. Finding crops we can grow and a market to sell it is not really as hard as it seems. The specialist's experience with the wholesale trade has opened up this market for many Alberta growers.

To accomplish the improved and increasing production of vegetable crops, the program sponsored 28 educational courses and tours, published monthly Alberta Produce Notes, conducted research trials and on-farm demonstrations, answered on average 130 phone calls per month, had 30 growers visit the Centre per month, and the specialist visited 25 farms per month.

To accomplish the improved flow of produce through the marketing channels, the specialist worked closely with a growers marketing co-op called "Sunfresh Farms Co-op" (formerly Edmonton Fresh Vegetable Growers Co-op) which now boasts over 25 farms. The specialist also worked with the Farmers Market Program and in 1986, put the Farmers Market Awareness Week promotion in place which greatly increased growers income.

Greenhouse Summary:

The Alberta commercial greenhouse industry conducted a survey in 1986 and found itself to be 138.9 acres big with a full time staff of 1,200. The greenhouse program looks after this production, which includes long English cucumbers, tomatoes, ornamentals, bedding plants and foliage plants. Growers continue to make more gains in production and marketing.

The specialist runs an entire extension program which includes courses and tours, phone calls and farm visits, monthly publishing of Alberta Greenhouse Notes and close work with the Alberta Greenhouse Growers Association.

The specialist also runs a research program which directly relates to grower problems, thus helping the industry expand quickly.

Other Highlights:

The Centre's professional staff moved into a new building in 1986, named the A.M. "Art" Wilson Building. The best part of the building is the 65 seat conference room which has already seen countless courses and meetings which are very important to the horticulture industry.

Staff also were directly involved with the annual meeting of Bedding Plants Incorporated, a convention of 1,200 people which attracted a world wide audience.

In closing, the success of the Alberta Tree Nursery and Horticulture Centre is talented people working closely with growers and grower groups in a very close fashion. We like to feel we are a very vital part of the horticulture industry in Alberta.

ALBERTA HORTICULTURAL RESEARCH CENTER

The Alberta Horticultural Research Center (AHRC) is involved in province-wide extension and research activities relating to all areas of horticulture and irrigated speciality crops. Cooperative research projects are conducted in collaboration with personnel from Agriculture Canada, University of Alberta, other Plant Industry Division Branches and the Irrigation and Conservation Division of Alberta Agriculture.

AHRC provides research, development and extension services to specific horticultural and/or commodity sectors. The Horticultural Production Section carries responsibility for research and extension into production of small fruit, bush and native fruit, ornamentals and nursery crops, greenhouse vegetable and flower crops, vegetables, potatoes and seed potatoes. The Special Crops Section conducts applied research, demonstration and extension activities for a variety of new crops such as beans, forages, grain legumes, herbs and spices, and corn. In addition to providing technical support for the commodity based programs the efforts of the Crop Protection and Utilization Section are directed toward diagnosis of plant diseases, insect and weed control, crops storage, food processing and product development. Administrative and operational support for the above three program areas are provided by the Administrative Services Section and the Farm Operations Section, respectively.

Test sites for the research extension function of AHRC staff are located throughout the province. In addition to the utilization of the three farms at Brooks, research/demonstration plots are found in locations such as Bow Island, Edmonton, Standard and the Peace River region.

The extension activities of AHRC personnel support and complement extension services provided by the other Alberta Agriculture staff centered in regional and district offices. Contact with both commercial and amateur horticulture clients is assured by maintaining a close working relationship with the industry, input into advisory committee recommendations, and involvement with grower groups and associations.

Staff regularly conduct, teach and participate in numerous short courses and seminars held throughout the province. To ensure rapid exchange of information between the producer and the researcher, staff host commodity oriented field days at AHRC and participate in similar field days held elsewhere. Membership and active involvement in commodity advisory groups, Agriculture Canada expert committees, and industry-based committees permit the dissemination of applied research information to all sectors of the horticulture industry.

Effective April 1, 1987 an official name change was put in place for the Center. It is now the Alberta Special Crops and Horticultural Research Center (ASCHRC). This name change reflects an increased role in research, development and extension activities in relation to Special Crops.

a) Vegetable Program

Cultural studies were conducted to evaluate the effect of plant populations on yield and maturity of several vegetables. The effects of mulches and tunnels on earliness and total yield of vine crops and sweet corn continued to be evaluated. This program carries responsibility for cultivar testing of a number of vegetable crops, including cooperative testing of asparagus from the national breeding program and an evaluation of rhubarb.

b) Potato Program

The potato program is extensively involved in seedling and cultivar evaluation as part of the Prairie Regional Trial System and the Prairie Breeding Program. Special efforts were made to introduce new cultivars to the commercial industry in a more direct manner. A number of cultural or production trials designated to improve technology for potato producers were conducted. The Alberta Potato Production Guide was completed.

c) Seed Potato Program

The seed potato program provided 57,000 pre-elite tubers to Alberta seed potato growers. Several techniques to improve tissue culture production and disease detection were introduced into the program. Particular efforts were made to improvement of quality. A proposal to privatize this program was initiated.

d) Special Crops Section

Cultivar evaluation and improvement of production practices for a number of special or alternate crops are the main emphasis of this program. Cooperative projects were conducted with the Soils Branch, Field Crops Branch and the Alberta Hail and Crop Insurance Corporation. A new special crops mandate was approved for the Center.

e) Fruit Crops Program

Emphasis was placed on the development of production practices of saskatoons, strawberries and raspberries. Efforts were directed to extension. Several new varieties of strawberries were introduced to Alberta Producers. Work was continued with saskatoons through cooperation of the Fruit Growers Society of Alberta.

f) Ornamentals Program

Added emphasis was placed on container production of nursery stock. A fertility trial was initiated in cooperation with Farming For The Future and additional overwintering studies were conducted with containerized material. Plants continued to be added to the Center's Arboretum. Additional plantings were made at Regional Hardiness trial sites in southern Alberta.

g) Greenhouse Program

The emphasis in the greenhouse program is gradually shifting more to cut flower production, although studies also continued on various greenhouse vegetables. A need for stricter environmental control within the research greenhouses was re-identified. Significant progress was made in computerization of extension materials particularly soil test and fertility recommendation data.

h) Plant Pathology Program

Several projects were continued, including screening of processing pea varieties for resistance to root rot and evaluation of fungicides for the control of powdery mildew on greenhouse cucumbers. Support was provided to the alfalfa seed industry in the management of a Chalkbrood project. Disease surveys: blackleg of canola, sugar beet cyst nematode in canola and verticillium wilt of alfalfa were conducted.

i) Post Harvest Physiology Program

Storage quality of cabbage as effected by fungicide treatment was further evaluated. CO^2 levels in commercial potato storages were monitored. A CO^2 level study was initiated at the Center. This program also carries a plant pathology responsibility where disease screening support was provided to the Prairie Potato Breeding program. A study on fairy ring control in turf was completed. Mushroom extension is a third responsibility. Numerous enquiries were answered.

j) Entomology Program

Monitoring for Dutch Elm Disease and Vectors was conducted at various border points in southern Alberta. The European Corn Borer survey and control research was continued. Trials on the biological control of greenhouse pests and greenhouse insect surveys were also conducted.

k) Weed Control Program

Trials for weed control, where new herbicides or candidate herbicides are evaluated for efficacy data, were conducted in most crop areas for which the center maintains responsibility. Several on-farm demonstrations, particularly at commercial nurseries, were well received. Work with weed control of saskatoons was continued in the Peace River area.

l) Regional Crops Laboratory Program

In excess of 1,800 specimens were received at the laboratory in Brooks, and approximately 600 at the laboratory in Olds. The number of samples received from commercial horticulture and special crops producers continued to increase.

m) Food Processing and Quality Evaluation Program

The processing of saskatoons, with an effort to improve saskatoon product quality continued, as did the quality evaluation of cultivars of fruits, vegetables and potatoes.

Assistance was provided to commercial processors both in regard to quality control and equipment development.

A more comprehensive description of AHRC research and extension activities may be obtained by requesting the 1986 Alberta Horticultural Research Center Annual Report. Details concerning cultivar evaluation trials on various crops are available in the AHRC pamphlet series. These are available from the Librarian, AHRC, Bag Service 200, Brooks, Alberta TOJ OJO.

REGIONAL REPORTS

Region I - Lethbridge

Blair Shaw, P.Ag., Regional Crop Production Specialist
Blair Roth, P.Ag., Special Crops Specialist
Don J. Wentz, P.Ag., Soil/Crop Specialist

In Region I at the end of the year, crop yields were average or better in most instances. There were not an unusual number of hail storms or dried out areas, but there were a few new problems in cereal crops.

The brown wheat mite, the green plant bug and stripe rust had not caused important crop damage until this year. The brown wheat mite was found in the areas east, north and west of Coutts, where it transmitted barley yellow streak mosaic to barley and, to a much lesser extent, to wheat.

The green plant bug, which is an aphid, infested fields from Cardston in the west, through Del Bonita, Milk River, Foremost and Seven Persons in the eastern part of the region. Thousands of acres were sprayed which minimized the losses.

A large proportion of Fielder soft white spring wheat in Region I was infected with stripe rust. The rust apparently overwintered in the region and when the conditions were right, the disease rapidly spread from west to east. Losses varied, up to 75% according to some reports, with 45% yield reductions common. The stripe rust resistant variety, Owens, was not widely grown because of seed supplies and other agronomic factors.

Some crops such as, sugar beets and irrigated hay produced above average yields and quality.

The rainfall during harvest caused a marked deterioration in grade for late maturing cereal crops. These poor grades, and the low prices, have substantially cut farm income in the region.

The use of herbicides, fertilizers and insecticides was near average. In some areas which had aphids, grasshopper or cutworm outbreaks, increased usage was based on a farm by farm need.

In the spring, soil erosion was very serious until the crops had grown sufficiently to protect the soil. Summerfallow wasn't the only reason for soil erosion problems, as crop kind and land tenure also were highly correlated to the severity of erosion. This year there were fewer fields blowing which had been problem fields last year. This change was largely due to joint provincial and municipal programs and widespread farmer cooperation.

The number and extent of farm demonstrations and trials increased as the interest in alternative crops expanded, driven by low prices for conventional crops.

In 1986, special crop acreage in southern Alberta was up approximately 27% over 1985. Significant acreage increases were seen in crops such as dry beans, dry peas, lentils and mustard.

The growing season had an above average accumulation of heat units, resulting in excellent corn and dry bean crops. The wet fall dramatically reduced the quality of any crops still to be harvested and caused close to 1000 acres of sugar beets and 1000 acres of dry beans to be left unharvested as winter approached.

The commitment of the farming public to controlling dryland salinity continued despite the poor crops and low rainfall last year.

The Dryland Salinity Investigation Service became more effective in 1986, with the use of new application procedures. The Region I team leaders initiated a D.S.I.S. procedures manual that will standardize the investigations in Alberta and across the prairies.

This region processed 29 applications which brought the total to 214 farmer applications. The implementation of recommendations is about 75% and alfalfa yields have reached two ton per acre on dryland.

The containment program for leafy spurge in the major drainage basins continued, with an increased number of biological controls in place, courtesy of the Environmental Center.

The eradication of diffuse and spotted knapweed and nodding thistle is essentially complete with only a few seedlings to control around old patches. Interprovincial and international cooperation has prevented reinfestment from the west and south where there are large populations of these weeds, particularly the two knapweeds.

Scentless chamomile is moving into the region from the north, probably via hay and seed. This weed has a potential to run wild in irrigated hay and perennial seed crops.

Dodder, a parasitic weed, was found in one field of sugar beets. The plants were controlled by roguing.

The early fall rains and generally mild weather were excellent for fall seeded crops, but later rain delayed seeding past the optimum seeding dates.

Region II - Airdrie

L.J. Welsh, P.Ag., Regional Crop Production Specialist

1986 proved again that farming in Alberta can be a very frustrating and trying experience. The year was similar to 1985 in many respects but differed immensely in the amount of total growing season precipitation. While little drought was experienced, the fall harvest was very similar. Little or no combining was done during August and September with nearly the entire crop harvested in October. Like 1985, crops lay in swaths for up to 6 weeks. Many crops were still grass green when the first killing frosts of fall occurred. What crops weren't frost damaged or destroyed (ie: canola) severely deteriorated in quality from lying in the swath too long. No. 3 and feed grade cereals and sample canola were common. Six inches of rain fell in the Calgary area in the month of September! The one consolation to the poor quality was that yields were very high on crops that weren't destroyed by the fall frosts. Many of the late crops were caused by delayed seeding as a result of the late spring very heavy snowfall that hit the region on May 14th and 15th. 31 cm. of snow crippled the region and caused a 3 week delay in field operations.

Hay crops were high yielding but quality again was reduced because of heavier than normal rains. Pastures did receive some respite from the drought of 1984 and 1985 but recovery from over grazing is not possible in one year. Good pasture management will be further required in 1987.

Insect problems were down in 1986. This was no doubt a result of the heavy precipitation through June and July. Plant diseases were worse than normal as one would expect in a wet year. Net blotch and barley scald were common and severe.

Very little acreage of fall rye and winter wheat was planted because of the wet weather (similar to 1985). As well, little fall tillage and weed control was accomplished. This was a blessing in that 1986 summerfallow fields, devoid of residue, went into the winter with substantial growth thereby reducing the threat of wind erosion.

The winter of 1986-87 was extremely mild with little snow. While this was pleasant for livestock and suitable for fall crops and landscape plants, it did cause a lot of concern about the possibility of bad wind erosion.

Farmers attitudes were justifiably pessimistic throughout the winter. Low crop prices and poor markets left them little to smile about. This was somewhat reflected in rather poor attendances at a number of farm production meetings. One highlight that caused a lot of excitement among farmers was their interest in the use of annual forages for grazing. Farmers that did try this practice were more than happy. High yields, brought on by the wet year, provided heavy stocking rates, some as high as 2 animals per acre for 4 to 5 months. Livestock prices on these growing animals remained at the same level between buying and selling. Winter meetings to discuss this practice were exceptionally well attended (100+).

The region's 12 Co-op Seed Cleaning plants had a mediocre year. Volume of cleaning was down. This was partially due to the poor germination of the seed to be cleaned. Germination was exceptionally bad along the western half of the region where crops were more severely hit by the hard killing frosts.

The Carstairs plant was finally built in 1986 after having sat for the 3 previous years in a partially built stage because of contract problems.

Many of the region's 9 Agricultural Service Boards continued in their "Maintenance only" mode of operation. Little expansion or deviation of program was experienced. This attitude has prevailed since their budgets were frozen in 1981-82. There appears to be some optimism however as they are now considering more soil conservation programs than heretofore.

The Foothills Forage Association continued operations with most of the management supplied by the Association members.

The Chinook Applied Research Association (C.A.R.A.) had another good year and appear to be filling a need in an area that sees little other agricultural research.

The Alberta Conservation Tillage Society (A.C.T.S.) now has an excellent secretary manager and is focusing much needed attention at the whole area of reduced tillage and the benefits of conservation farming.

At the dawn of a new crop year, farmers are in a real quandary to decide what crops to grow in 1987. Prospects appear bleak. Specialty crops are being pushed to the limit with no more contracts available. There is talk of increased summerfallow in 1987. This is a pity as soil moisture is exceptionally good and recropping would surely be successful. In spite of everything, most producers are optimistic. They have plans to try to hit the malting barley market or to get No. 1 grades. Both appear to be a good target to shoot for to increase sales and improve cash flow.

Region III - Red Deer

Wayne Jackson, P.Ag., Regional Crop Production Specialist

After two years of very dry growing conditions, the above normal rainfall was a welcome change. A heavy snow fall in mid-May delayed seeding a week but the moisture got crops off to an excellent start. Moisture levels during the summer and fall ranged from 12% to 150% of normal permitting good growth and an opportunity for sub-surface moisture supplies to be replenished. In high rainfall areas, surface moisture was excessive in the fall and low areas were inaccessible with harvesting equipment. Some producers in the south or eastern portion of the region were able to complete harvest in January, 1987 as most of the snow had melted off. However, approximately 5% of the crop remained out the following spring.

Field Crops

Yields of cereals and oilseeds were near record levels for 1986 but the quality left a lot to be desired. With the high rainfall, growth was exceptional but the maturity was sufficiently delayed that the early September frost caught most crops before they had fully ripened. Thus, bushel weights were below normal and grades were adversely affected. Most wheat graded #3 C W or feed. Bushel weights for barley ranged in the 40-46 lb/bus. range. Canola samples were also affected as less than 40% graded #1 Canada. Most canola graded #2 or #3 Canada but a significant portion went "Sample" due to green seeds. The chlorophyll content of canola remained high well into fall and most canola harvested before October 1st was down-graded because of green seeds.

Seeded acres of crops changed little from the previous year. Canola acreage remained high because of price and market opportunities while barley and oat acreage dropped slightly. A few producers are pushing the canola acreage in their rotations as high as possible so that it is grown every third year instead of one in four. So far, a major disease or insect outbreak hasn't materialized but the potential is there.

The acreage of special crops did not increase to any great extent but a few producers did try peas, lentils or canary seed on small acreages.

The market opportunities for the poor quality grain were quite limited and most of this grain remained on inventory at year end, especially the #3 C W wheat. With reduced barley quotas most producers took advantage of the Canadian Wheat Board's contract program for barley and sold a high percentage of their production via this alternative.

Forage yields were good but the quality deteriorated significantly over July. Most did not get harvested until late July - early August and most stands had weathered badly in the swath or matured greatly standing. Fall prices for hay ranged in the $35 - $45/ton - down significantly from the previous two years.

Volume in the seed cleaning plants remained about the same at 4.7 million bushels. However, the plants in the eastern half of the region improved their volume to off-set the drop in the western plants due to poor germination of seed. The prospects for maintaining that volume in the coming year are very low as much of the grain sprouted in the fall making germination for seed poor.

Soils

Soil erosion in the region was fairly minor except for a few isolated spots. Little fall work was done in 1986 due to late harvest, so much of the stubble was left to trap snow and prevent drifting.

Fertilizer use remained high with anhydrous ammonia still accounting for a large amount of the applied nitrogen. One of the local dealers set up a Concord airseeder so that dry fertilizer could be banded directly into established forage stands. The demonstration plots of this technique proved very interesting and very successful so I think the demand for this service will grow.

There's a lot of interest in organic fertilizers and soil conditioners. With prices dropping, producers are certainly looking at ways to reduce costs.

Horticulture

Commercial vegetable production attracted two or three new producers who did relatively well. With the prices of traditional crops decreasing, market gardening is gaining popularity all the time.

One Saskatoon grower was very successful in shipping truckloads of product into Vancouver for Expo '86.

The demand for house plants and home ornamentals is so high that a strong horticulture industry has developed around Red Deer.

Crop Pests

1986 was characterized by crop diseases. With the high moisture conditions, diseases in cereals flourished, with scald, net blotch and smut being very prevalent. It appeared that many of the later varieties and 2-row varieties of barley suffered yield losses due to disease.

Insects were present but caused little damage in crops. Some spraying was done in the eastern half of the region for forest tent caterpillars but numbers appear to be on the decline.

Perennial weeds continue to increase and be of a significant concern. Quack grass and Canada thistle are the major perennial crop weeds, as continuous cropping allows these weeds a competitive advantage. Scentless chamomile continues to spread but the number of heavy infestations appears to be declining.

Ox-eye daisy is starting to be a problem in the north-west portion of the region and spreading dog-bane has been identified as a potential pest in the region.

Extension

After some initial farmer apprehension in the fall of 1985, the mood became more optimistic as spring approached. The interest in new varieties and herbicides was as strong as ever. Also, new ideas sparked interest and several on-farm demonstrations through Farming-for-the-Future were carried out. Interest in this approach should remain strong.

Region IV - Vermilion

E.L. Treffry, P.Ag., Regional Crop Production Specialist

The following is a short summary of some of the major trends and concerns in the Plant Industry sector during 1986 in Region IV.

Weeds, Plant Pests and Insects

The increase in continuous cropping and minimum tillage has seen an increase in perennial weeds. The three of importance continue to be couchgrass, Canada thistle and toadflax. A major increase in the amount of toadflax was noted in 1986 in our region. It was also noted that chemical fallow required the control of winter annuals, preferably the previous fall. The winter annuals of particular concern were narrow-leaved hawk's-beard, stinkweed and flixweed.

The spread of scentless chamomile along the edges of highways and secondary roads was very noticeable, as it was in 1985. Continued effort to control this spread along the edges of roads is required.

The plant pest problem remained low in 1986. Insects present and offering potential concerns in 1987 include red back cutworm, bertha army worm and grasshoppers.

Virulent blackleg in canola has been diagnosed along the Saskatchewan border in the County of Vermilion River. The seriousness of this disease and the steady movement westward into Alberta is a concern to the canola industry. Awareness programs involving all sectors of the industry along with research towards resistant varieties are important avenues of approach to the program.

Soils and Soil Conservation

Dryland salinity continued to be addressed in Region IV. The dryland investigation program involved provincial, municipal and P.F.R.A. agencies. A complicating factor in Region IV is the large area of solonetzic soil. Combined these factors create a very difficult soil management, control or reclamation problem.

Conservation fallow and its many ramifications became a topic of interest. Timing, choice of implements and alternative cropping patterns, including green manuring, were addressed by meetings and demonstrations. The cost of seed for good nitrogen fixing green manure crops remains a problem. There appears to be a potential for seed production for green manure crops if the seed can be produced at a price so that farmers will utilize it willingly.

A followup to the deep ripping demonstrations is the question of possible "working layer" compaction. In 1986 several producers asked about this situation and in the future this question will be addressed.

Horticulture

Ornamental horticulture involving farmstead planning, beautification and selection of materials for rural landscaping continues to be well received. Many young farm couples are involved in new home site planning or the upgrading of existing sites. Meetings held by the Alberta Tree Nursery and Horticulture Centre staff as well as local extension staff were well attended with a great deal of interest being shown.

A need exists, but the interest is lacking, in field shelterbelts in Region IV. The cleanup of existing treed areas in fields and the fence to fence clearing concept is leaving large areas bare and open. Will greater evaporation as well as wind and water erosion be the result? This trend appears to be developing.

The number of locally sponsored flower and vegetable shows has risen. Local interest remained high with the quality of the exhibits very high. This has also encouraged the formation of Horticultural Societies or Garden Clubs which are filling an important function in the community.

Field Crops

The search began in 1986 for alternate cropping possibilities as supplies of cereal grains escalated and prices began to fall.

Lentils dramatically increased in acreage. Yields were variable depending on the district, weather conditions and management practices. It became very evident that in the first year of production, guidance should be made available to "first time" producers. There is a lot of producer interest in pulse crop production in Region IV and the potential volume of production is significant. It's important that research, demonstration and marketing techniques pertaining to pulse crops be continued and increased.

The quality of cereal crops in many districts was affected by frost and harvesting conditions. Yields were high but the quality factor will affect farmers returns.

Farmers are making more use of the data from the regional cereal and oilseed plots. With the increased number of varieties, many of which are more area specific in adaptation, the value of this data will increase.

The new Vermilion Seed Cleaning Cooperative facility began operation in the spring of 1986. The Willingdon Seed Cleaning Cooperative began planning for a new facility in 1987. Region IV has made extensive use of the new plant program and the upgrading program.

Region V - Barrhead

Bill Chapman, Regional Crop Production Specialist

(i) Cereals and Oilseeds

The 1986 crop was affected by a number of factors which lowered the potential increase in average yields to 5-10% above the recent 5 year averages. The factors included a dry period around seeding due to widely scattered showers. As a result a number of fields had 30-45% second growth present. Post emergent weed control efficiency was also reduced by the dry conditions and late flush of weeds. The main areas affected were the Athabasca, Barrhead, and Westlock.

An excessive amount of rainfall in July, 175% of normal, created a micro-environment suitable for leaf diseases on cereals and sclerotinia on canola. The region received approximately 10-15 cm (4-6") of rain on the July 19 weekend. As the soil moisture levels were at field capacity the excessive moisture created flooding conditions along the creeks leading to the main rivers in the region. The flood waters peaked above the last serious flood in 1940's.

The highest damage reported to crops and farm yards was along the Pembina River System. About 50,000 acres and 125 farmsteads were affected.

TABLE 1 NUMBER OF ACRES FLOODED BY MUNICIPALITY

Municipality	Cereal Grains	Hay	Pasture	Total
County of Athabasca	821	1,219	1,000	3,040
County of Barrhead*	7,104	5,602	2,550	15,256
County of Lac Ste. Anne*	2,095	2,626	1,466	6,187
County of Leduc	1,827	845	416	3,088
County of Parkland*	1,927	1,839	1,652	5,418
County of Strathcona	295	18		313
MD of Sturgeon	2,222	779	360	3,361
County of Thorhild	224	225	10	459
M.D. of Westlock*	12,846	7,045	3,540	23,431
I.D. #14*	833	3,374	2,089	6,296
I.D. #15	378	996	494	1,868
I.D. #17E	150	500	480	1,130
Total	30,722	25,068	14,057	69,847

*Denote Pembina River System Losses.

Payments to date on total crop losses from the flood are 5.5 million dollars for the region and all appraisals are not yet complete.

An added benefit to farmers was the implementation of Federal Government assistance to cover soil erosion losses through (Soil Conservation Area Program (S.C.A.P.) administered by Conservation and Development Branch. The estimated cost is $2,000,000.00 for soil erosion. Other major costs covered by Alberta Environment include emergency drainage and repairs to municipal roads and bridges.

Harvest started in late August and proceeded until September 10 when wet cool weather set in until the 10th of October. Approximately 35% of the total crop was harvested in good condition prior to the rain. The remaining crop was weathered and sprouted in 25% of the fields. Most of the sprouted grain was swathed early and combined late in October. This wet weather also increased the amount of malt barley accepted, provided it was harvested before the rains. The percentage accepted is not major but is critical to local farmers who have had samples accepted previously.

One noticeable difference is that the winter had higher mean temperatures and a lack of snow. The region received 65% of normal snow fall but had 20% to 30% more precipitation by November 1 which left excellent soil moisture reserves.

A market which opened up for farmers in the region was pony oats. In excess of 400,000 bushels (6200) tonnes moved into the American market from the area. This volume is in addition to any present markets established. All of the oats were cleaned in the seed cleaning plants at Morinville and Stony Plain. The new market opportunity could be very beneficial to farmers in the region as oats is an economical crop to grow.

Seed cleaning plants cleaned 368,521 bushels of seed July 1, 1985 to June 30, 1986, 97% of the previous year. The new 1.4 million dollar plant at Stony Plain came on stream in 1986. The grant of $124,016.00, was 24% of the total upgrading grant for the 7 regions in the province. Separations were up significantly on malting barley and oats.

The extension season for the past year covered a number of topics but focused on economic and agronomic practices. Production economics were drastically affected by expected low initial prices. Staff discussed the cost benefit relationships of most inputs and operations. In some cases it is possible to minimize the loss and cover cash costs. One noticeable difference was the average age of those attending was over 45-50 years with a high level of equity. Only at 2 or 3 meetings did I see a larger number of younger farmers.

We continued to hold joint meetings at 4 locations with the Canola Growers and Western Barley Growers Associations. The main highlight was an Alberta Agriculture Fertilizer Forum on Nutrients. Over 125 dealers from Esso Sherritt Gordon, Westco and Cominco participated, as well as the company dealer representatives, the Soils branch of A.D.A. and the Soils Department University of Alberta. This meeting discussed the most up to date research and allowed for further cooperation by regional staff with their local dealers.

The twelve Agricultural Service Board carried out a wide range of projects. Their plots and tours were more agronomic in nature and follow up observations on plot yields are being utilized by district staff. Stony Plain district office and the County of Parkland have carried out one of the best plot tour and a cooperator appreciation banquets of any A.S.B. A major step forward by I.D. #14 is its weed control program. It is now recognized provincially as the most effective program cost shared with farmers.

Ken J. Lopetinsky, Forage and Special Crops Specialist

(ii) Forage and Special Crops

General Overview

The 1986 growing season started off later than normal resulting in a slow late start to pasture and hay crops and eliminating long season crops such as fababeans in the area. This start was followed by extremely dry to droughty conditions in late May and June causing first cut hay crops to be average to below average in yield. Quality of the first cut was excellent until the end of June. July was all rain with almost no haying completed. There was a good recovery of pastures and early first cut hay fields. Many producers enquired about hay preservatives and silage. August was extremely dry which resulted in the late first cut over-mature fields to be baled without rain. Early second cut hay fields were again of high quality and excellent yield if baled before September, as September was again a rainy month. Most of the second cut hay was baled into October. The mild winter resulted in very little damage to perennial forages this past winter.

Specific Observations

A. There was a slight increase in field pea acreage in the Region. Yields varied from 2000 - 4000 lbs./acre with the wrinkle feed-type peas being higher yielding, quality was a feed grade and most production was marketed in the fall at a $4.00/bushel value.

B. Both the Pembina and West Central Forage Associations continued to maintain a high producer involvement and interest in all activities. Membership livestock was used on both associations' steer pastures as well as Pembina's new cow-calf pasture. Returns to labor and management ranged from $60 - $90 per acre for these two intensive steer pastures.

C. The Northern Branch of the Pulse Growers Association of Alberta again conducted various field projects with the help of the On-Farm-Demonstration Program. Results were again encouraging for field peas. This, combined with the producer's group involvement in various winter seminars, will result in a very high anticipated seeded acreage of field peas in 1987.

D. Interest remains high in forage agronomics and has increased tremendously in pulse agronomics especially field peas. A total of 41 speaking engagements, 31 on forages and 10 on special crops, including pulses, resulted in a very active extension season. It is predicted that this interest will remain high for the next year.

E. Involvement in a total of 10 On-Farm-Demonstration programs in the forage and special crops areas has resulted in some excellent local extension data as well as farmer tours to see, first hand, some of the new technologies. This demonstration program has been very well received in the Region.

F. The hay sales of the past few years did not materialize in 1986-1987, although some producers with long time established markets managed to sell all their hay at good prices. On the other hand, those producers with a bit of surplus and expecting high prices, have been left with hay carry-over. There is a very high carry-over of hay this year.

Producer Concern

The switch to alternate crops, mainly field peas in the coming year, will result in many new growers with no previous experience. It is hopeful that a keen approach to marketing results in relatively stable prices of these new crops, mainly pulse crops. A drastic decrease in prices this fall could result in a cash flow shortage similar to barley. Contracted acreage in some cases does not lock in a price on all production. Therefore, if there is a high "speculative" quantity of pulse crops to be priced after harvest, prices may decline.

Region VI - Fairview

Mike Rudakewich, P.Ag., Regional Crop Production Specialist

The 1986 year featured a mix of events, circumstances and outcomes in crop harvest and economics.

Sowing of cereals and oilseeds featured a repeat of 1985 in that wheat, barley and canola acreage was almost equally split but with a slight reduction from 1985.

Seeding was delayed by spring harvest, unworked fields and rain and snow May 13. With a down turn in the economy, inputs for fertilizer and weed control were reduced and in a few cases seed of questionable quality was used. A prolonged drought ensued, 60 days without rain, which effected the entire region, excepting the Fort Vermilion area and the southwest portion, including the County of Grande Prairie where frequent showers covered most of the district.

The long drought led to other negative consquences such as substantial crop plowdowns, extremely late germination and second growth in crops, late and reduced levels of herbicide applications, and poor establishment of newly seeded forage stands.

Subsequently most crops were more prone to frost injury which indeed did occur throughout the region. Canola suffered the most obvious damage where despite good yields about half of the grades were #2 and #3 and some even sample.

Early maturing crops of cereal made good grades and resulted in substantial shipments of malt barley, some milling oats, grades 1 and 2 Canada Spring Wheat and seed stocks generally of very good quality. However, the majority of the cereals suffered from the consquences of the weather with reduced quality and low yields.

Harvest weather was much improved from 1985 with a reasonably early completion, though the majority of the grain needed drying.

Forage seed crops however were the highlight of 1986 because of excellent seed prices and average to slightly above average yields. Brome grass and crested wheat grasses featured all time record high prices. The dismal situation and outlook for cereals and oilseeds and the buoyant forage seed situation will lead to a very high seeding of various forage crops in 1987.

Though adverse for cereals and oilseeds, the weather factor was not as detrimental to other crops.

Alfalfa dehy plants all reported a good production year. Conditions favoured good establishment of fall rye and winter wheat and at this point, April 30, 1987, the overwinter survival appears good. Forage supplies for livestock were both adequate and of good quality.

Significant Trends:

1. The poor grain economy resulted in an increase in fallow to 736,000 acres from 600,000 in 1985. From a conservation outlook this situation is unfortunate and regressive as most farmers had become very comfortable and enthusiastic about continuous cropping.

2. Farm managers will accept new crop varieties according to data, information and experience. Katepwa wheat, Otal and Harrington barley and Cascade oats are the newer varieties gaining in popularity. Jasper oats and Jackson barley appear to be next in line.

3. In spite of the high degree of interest in crop alternatives other than cereals or canola there is no major shift to the so called alternate crops of buckwheat, lentils, fababeans and canary seed. Instead farm managers in this region are opting for forage seeds, peas, winter wheat and flax for 1987.
4. Major capital expansions over the last 10 years are really hurting farm families now. The number of large farm liquidations is unprecedented. This experience should be a lesson for all and hopefully lead to more effective and secure capitalization programs for the future.

5. Poor economics and adverse weather have caused weed problems to become more prominent.

6. Dependance on fertilizers especially anhydrous ammonia continues to be high despite poor economics.

Plant Industry related extension activities were quite diverse in topic coverage and well attended.

1. The highlight of interest was perennial weed control. The transition to continuous cropping, combined with several years of adverse weather, falls that limited both harvest and normal post harvest tillage have brought the problem of weeds to the fore. Farm managers have shown a keen interest in the latest research on chemical/cultural control systems and methods. A total of 10 meetings were conducted.

2. Interest in forage seed cropping for soil improvement and improved farm income is very high. Main areas of technical interest are effective inoculation methods, stand establishment and weed control. Meetings were conducted in five major seed producing districts.

3. A number of meetings were held on crop varieties, management of special use crops and associated agronomics ie. use of good seed, seedbed preparation, and proper dates of seeding.

4. The number of calls to farms on problem solving were very high and mainly related to problems in canola and problems with perennial weeds.

Demonstrations

1. Agriculture Service Board demonstrations continue to serve as the main source of field demonstration. The attendance at these tends to range from very high to fair. The onus remains with the ASB to ensure that the objectives of new demonstrations and tours remains forward looking and well planned for objectivity.

2. Interest in On-Farm demos has picked up considerably. Because of the origin of these demonstrations farm managers place considerable value in their results.

There is a major need by the Department of Agriculture to furnish appropriate equipment to meet the needs of demonstrations and to facilitate their completion. Good demonstrations can be the fastest adoption method of farm technology.

Research:

Research information has gained the high profile and value that it deserves. It is unfortunate that at the time that this has become true, funding agencies have restricted availability of money. It is obvious that new means of approaching funding agencies need to be utilized if agriculture is to receive its fair share.

Activities have been quite numerous in defining research needs, planning for projects, etc. The following were the major endeavors in this area.

1. In cooperation with C.D.A., Beaverlodge, documentation of the need for breeding of early maturing wheats in the northern areas of the Prairies.

2. Meeting with farm managers and C.D.A., Beaverlodge, A.D.A. and B.C.D.A. to discuss research on various crops new to the region.
3. Internal meetings of Alberta Agriculture to discuss needs and means of implementation of research and trials for maximum economic yields.

4. Meeting with Peace Region staff and Beaverlodge Research Station staff on general needs in research .

5. Review of research needs in canola production.

6. Review of research needs in all areas of Weed Control.

7. Review of needs in legume cropping and plowdown.

8. Review of needs in Forage Seed Marketing.

In conclusion it seems agriculture is well endowed with various means of highlighting and publicizing new technology but without funding for key areas of research what will there really be to publicize.

INVENTORY OF PLANT INDUSTRY RESEARCH PROJECTS - 1986

Projects	PMY	TMY
Cereals and Oilseeds	3.2	17.4
Forage Crops	1.1	1.15
Special Crops	1.05	1.3
Ornamentals, Trees and Shelterbelts	1.13	2.21
Fruit Crops	0.8	1.34
Vegetables and Potatoes	3.09	4.88
Greenhouse Crops	.81	3.07
Problem Soil Management and Soil Fertility	3.1	8.9
Weed Control	2.13	3.07
Apiculture/Entomology	.8	.85
Totals	17.21	44.17

CEREALS AND OILSEEDS

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Development of new 6-row feed barley varieties for Alberta	Irrigation 1 site Area 1, 1 site Area 2, 1 site Area 3, 1 site Area 4, 4 sites Area 5, 2 sites Saskatchewan - 1 site	J. Helm	Field Crops	Ongoing Annual Report Field Crops library Agriculture library	0.2	2.0
Development of new 2-row feed barley varieties for Alberta	Irrigation, 1 site Area 1, 1 site Area 2, 1 site Area 3, 1 site Area 4, 4 sites Area 5, 2 sites Saskatchewan - 1 site	J. Helm	Field Crops	Ongoing Annual Report Field Crops library Agriculture library	0.2	2.0
Development of high lysine and hulless barley varieties which have improved feeding value	Irrigation, 1 site Area 1, 1 site Area 2, 1 site Area 3, 1 site Area 4, 4 sites Area 5, 2 sites Saskatchewan, 1 site	J. Helm	Field Crops	Ongoing Annual Report Field Crops library Agriculture library	0.1	0.5
Barley germplasm creation and maintenance	Lacombe	J. Helm	Field Crops	Ongoing	0.1	0.9

CEREALS AND OILSEEDS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
The heritability of straw strength in Samson and other semi-dwarf barleys	Lacombe	J. Helm	Field Crops	Ongoing	0.1	0.1
Cereal and oilseed regional variety trial on barley, wheat, oats, flax and canola	Irrigation, 4 sites Area 1, 4 sites Area 2, 3 sites Area 3, 4 sites Area 4, 6 sites Area 5, 7 sites Area 6, 5 sites	J. Helm D. Salmon B. Wolfe K. Briggs D. McAndrew S. Kibite R. Gaudiel K. May	Field Crops Field Crops Ag. Canada U of A Ag. Canada Ag. Canada AHRC Ag. Canada	Ongoing Reported in Annual Report, Cereal & Oilseeds Advisory Committee and reports in all research libraries in Western Canada.	0.1	1.2
Intensive management systems for barley and wheat production	Lacombe	J. Helm D. Penney	Field Crops Soils FFF	Report to FFF	0.1	0.7
Development of new spring triticale varieties	Irrigation, 1 site Area 2, 1 site Area 3, 2 sites Area 4, 3 sites Saskatchewan, 2 sites	D. Salmon	Field Crops	Ongoing	0.4	1.9
Germplasm development and evaluation in spring triticale	Lacombe	D. Salmon	Field Crops	Ongoing	0.1	0.2
Selection for improved seed development in triticale	Lacombe	D. Salmon	Field Crops	Ongoing	0.1	0.1

CEREAL AND OILSEEDS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Development of improved varieties of winter wheat and triticale	Lacombe Brooks Lethbridge Olds Trochu Saskatchewan, 3 sites	D. Salmon J. Helm	Field Crops	Ongoing Annual report Field Crops library Agriculture Library	0.4	1.7
Germplasm development and evaluation in winter wheat and triticale	Lacombe	D. Salmon	Field Crops	Ongoing	0.1	0.2
Identification of lines of barley, triticale and winterwheat, with improved levels of post harvest dormancy	Lacombe	D. Salmon J. Helm	Field Crops	Ongoing Published "Crop Science"	0.1	0.2
Silage production of barley and triticale	Lacombe	F. Mederick J. Helm D. Salmon	Field Crops	Ongoing Annual Report Field Crops library Agriculture library	0.1	0.2
Comparison of swathing versus direct combining of barley at different seed moisture content	Lacombe	F. Mederick J. Helm	Field Crops	Project complete Annual Report	0.1	0.3
Intensive cereal management in barley	Lacombe	F. Mederick	Field Crops	Ongoing Annual Report	0.1	0.5
Yield reduction of barley due to common root rot	Lacombe	F. Mederick L. Piening	Field Crops Ag. Canada	Ongoing Annual Report	0.1	0.3

CEREAL AND OILSEEDS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Screening barley germplasm for root rot resistance	Lacombe	F. Mederick	Field Crops	Ongoing	0.1.	0.4
Screening barley and triticale for foliar disease resistance	Lacombe Calmar Olds Trochu	F. Mederick J. Helm D. Salmon	Field Crops	Ongoing	0.1	0.5
Development of a screening method to evaluate winter hardiness potential in winter cereals	Lacombe Edmonton	F. Mederick D. Salmon	Field Crops FFF	Projects complete Report to FFF	0.1	1.1
Cultural practices associated with winter cereal production	Lacombe	F. Mederick D. Salmon J. Helm	Field Crops	Ongoing	0.1	0.5
Crop rotation in cereals	Lacombe Olds	F. Mederick J. Helm	Field Crops	Ongoing Annual Report	0.1	0.3
Yield losses due to lodging in barley	Lacombe	F. Mederick J. Helm	Field Crops	Ongoing Annual Report	0.1	0.2
Special crops agronomics for central and north central Alberta	Lacombe Camrose Morinville Vermilion	F. Mederick R. Park R. Gaudiel	Field Crops FFF AHRC	Project complete Report to FFF	0.1	1.5

FORAGE CROPS

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Perennial Forages	Brooks	R. Gaudiel	AHRC	Active	0.5	0.40
Diseases of Forage Crops	Brooks Lethbridge Southern Alberta	R. Howard H. Huang S.F. Hwang	AHRC Ag. Canada AEC	Disease surveys and active trials. AHRC Annual Report 1986. Plant Pathology Society of Alberta. Scientific Journals.	1.05	0.75

SPECIAL CROPS

Field bean cultivar and cultural trials	Brooks Bow Island	R. Gaudiel	AHRC	Active. AHRC Annual Report 1986. Alberta Pulse Committee 1986. Expert Committee, Bean Seminars 1986.	0.20	0.35
New crop cultivar, cultural, and adaptation trials	Brooks Bow Island Acadia Valley	R. Gaudiel	AHRC	Active. AHRC Annual Report 1986. Special Crops Committee 1986. Pulse Crops Committee 1986. Expert Committee 1986. Growers Meetings 1986.	0.40	0.60
Herbs and spices cultural and adaptability	Brooks	R. Gaudiel	AHRC	Active. AHRC Annual Report 1986.	0.05	0.05

SPECIAL CROPS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Corn and sorghum cultivar and cultural trials	Brooks	R. Gaudiel	AHRC	Active. AHRC Annual Report 1986. Alberta Corn Committee 1986.	0.20	0.10
Screening fungicides for efficacy against sclerotinia white mold on dry beans	Brooks	R. Howard	AHRC	Active. AHRC Annual Report 1986. Alberta Pulse Crops Adv. Comm. ECPUA Pesticides Research Report 1986.	0.05	0.05
Effect of soil loosening on root rot and yields of pulse crops	Brooks Various locations in southern Alberta	R. Howard R. Gaudiel R.C. McKenzie	AHRC AHRC Irrigation & Conservation	Active. AHRC Annual Report 1986. Alberta Pulse Crop Advisory Committee.	0.10	0.10
Screening fungicides for efficacy against sclerotinia white mold on dry beans	Brooks Bow Island	R. Howard	AHRC	Active	0.05	0.05

ORNAMENTALS, TREES AND SHELTERBELTS

Woody Ornamentals	Brooks	B. Casement	AHRC WCSH PFRA Nurseries Ag. Canada Morden	Active. Report to WCSH. AHRC Annual Report 1986. AHRC Pamphlet 87-3. Nurserymen.	0.34	0.30

ORNAMENTALS, TREES AND SHELTERBELTS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Annual and perennial flowers	Brooks	B. Casement	AHRC All America Selections	Active. Report to AAS and Seed Companies AHRC Pamphlet 87-2 AHRC Annual Report 1986.	0.21	0.65
Nursery production of woody ornamentals	Brooks	B. Casement	AHRC	Active. AHRC Annual Report 1986. Nurserymen.	0.30	0.70
Screening poplar cultivars for resistance to winter injury and bud-gall mites	Brooks	K. Mallett B. Casement	AHRC AHRC	Active. AHRC Annual Report 1986.	0.01	0.02
Regional woody plant hardiness test program	Various Alberta Sites	LANTA Growers B. Casement H. Oosterhuis G. Grainger	LANTA AHRC ATN & HC ATN & HC	Active.	0.15	0.25
Woody ornamental fertilizer trials	Edmonton	G. Grainger H. Oosterhuis B. Casement	ATN & HC AHRC	Active	0.10	0.25
Antidesiccant Studies of Evergreens	Brooks	K. Mallett B. Casement	AHRC AHRC	Active	0.01	0.02
Fairy Ring Eradication	Brooks	K. Mallett R. Howard	AHRC AHRC	Active	0.01	0.02

FRUIT CROPS

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Bush and native fruit culture and cultivar improvement	Brooks Edmonton	L. Hausher G. Grainger	AHRC ATN & HC	Active. AHRC Annual Report 1986.	0.20	0.60
Native fruit pilot project	Sexsmith Manning Fairview	L. Hausher J. Davidson	AHRC Ag. Canada Beaverlodge	Active	0.18	
Small fruit culture and cultivar improvement	Brooks	L. Hausher	AHRC	Active. AHRC Annual Report 1986.	0.25	0.60
Processing and quality evaluation of fruits	Brooks	T. Smyrl L. Hausher	AHRC AHRC	Active	0.02	0.04
Native fruit utilization	Brooks	T. Smyrl	AHRC	Active	0.15	0.10

VEGETABLES AND POTATOES

Carrot fall seeding	Edmonton	P. Dixon	ATN & HC	Ongoing	0.03	0.1
Cauliflower cultivars	Edmonton	P. Dixon	ATN & HC	Ongoing	0.03	0.1
Pickling cucumber cultivars	Edmonton	P. Dixon	ATN & HC	Ongoing	0.03	0.1
Chinese cabbage seeding dates	Edmonton	P. Dixon	ATN & HC	Ongoing	0.03	0.1

VEGETABLES AND POTATOES (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PHY	TMY
Chinese vegetable cultivars	Edmonton	P. Dixon	ATN & HC	Ongoing	0.03	0.1
College cultivar program	Edmonton Vermilion	P. Dixon P. Ragan	ATN & HC AHRC	Ongoing	0.08	0.12
Bulb crops cultural and cultivar project	Brooks	P. Ragan	AHRC	AHRC Annual Report 1986. AHRC Pamphlet 87-4.	0.20	0.30
Cole crop cultural and cultivar project	Brooks	P. Ragan	AHRC	AHRC Annual Report 1986. AHRC Pamphlet 87-4.	0.20	0.25
Pea and bean cultural and cultivar project	Brooks	P. Ragan	AHRC	AHRC Annual Report 1986. AHRC Pamphlet 87-4	0.25	0.25
Sweet corn cultural and cultivar project	Brooks	P. Ragan	AHRC	AHRC Annual Report 1986. AHRC Pamphlet 87-4.	0.05	0.05
Root crop cultural and cultivar project	Brooks	P. Ragan	AHRC	AHRC Annual Report 1986 AHRC Pamphlet 87-4.	0.02	0.05
Solanceous vegetable cultivar and cultural project	Brooks	L. Hausher P. Ragan	AHRC AHRC	AHRC Annual Report 1986. AHRC Pamphlet 87-4.	0.02	0.20
Vegetable mulch and tunnel project	Brooks	L. Hausher	AHRC	AHRC Annual Report 1986 AHRC Pamphlet 87-4	0.25	0.40

VEGETABLES AND POTATOES (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Vine crop cultivar and cultural project	Brooks	L. Hausher	AHRC	AHRC Annual Report 1986. AHRC Pamphlet 87-4	0.15	0.40
Perennial vegetable cultivar and cultural project	Brooks	L. Hausher	AHRC	AHRC Annual Report 1986. AHRC Pamphlet 87-4	0.01	0.10
Handling and storage of vegetables	Brooks	K. Mallett	AHRC	AHRC Annual Report 1986.	0.10	0.15
Processing and quality evaluation of vegetables	Brooks	T. Smyrl	AHRC	Active	0.20	0.20
Chemical aspects of carrots in storage	Brooks	T. Smyrl K. Mallett	AHRC AHRC	Active	0.15	0.05
Potato cultivar improvement	Brooks Various locations	C. Schapumeyer K. Mallett T. Smyrl D. Lynch	AHRC AHRC AHRC Ag. Canada	Active. Several trails. AHRC Annual Report 1986.	0.55	0.50
Potato production research	Brooks Various locations	C. Schaupmeyer	AHRC	Active. Several trials AHRC Annual Report 1986.	0.40	0.50
Processing and quality evaluation of potatoes	Brooks	T. Smyrl	AHRC	Active. AHRC Annual Report 1986.	0.15	0.50
Screening potato cultivars for resistance to early blight	Brooks	K. Mallett D. Lynch	AHRC Ag. Canada	Active. AHRC Annual Report 1986.	0.05	0.05

VEGETABLES AND POTATOES (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Susceptibility of commonly grown potato cultivars to bacterial ring rot	ATN & HC Vancouver	S. DeBoer I. Evans J. Stenrue	Ag. Canada Crop Protection	Completed. Reported to Alberta Potato Growers Annual Meeting	0.10	0.30
Evaluation of fungicides for the prevention of seed-piece decay in potatoes	Brooks	K. Mallett R. Howard	AHRC AHRC	Ongoing. AHRC Annual Report 1986.	0.01	0.01

GREENHOUSE CROPS

Culture of greenhouse vegetable crops	Brooks	G. Grant	AHRC	Ongoing and new trials. AHRC Annual Report 1986.	0.20	0.20
Culture of greenhouse floriculture and foliage crops	Brooks	G. Grant	AHRC	Ongoing and new trials AHRC Annual Report 1986.	0.10	0.10
Evaluation of hydroponic systems for greenhouse crops	Brooks	G. Grant	AHRC	Active	0.05	0.30
Diseases of greenhouse crops	Brooks	R. Howard G. Grant	AHRC AHRC	Active	0.05	0.10
Evaluation of rockwool as a substrate for Alberta greenhouse flower and vegetable crops	Brooks	G. Grant	AHRC	Active	0.20	0.30

GREENHOUSE CROPS (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Seedless cucumber production in nutrient film system and vermiculite	Edmonton	M. Mohyuddin	ATN & HC	Ongoing	0.025	0.25
Tomato varietal trials	Edmonton	M. Mohyuddin	ATN & HC	Ongoing	0.025	0.20
Gerberas pot size trials	Edmonton	M. Mohyuddin	ATN & HC	Ongoing	0.01	0.2
Propogation of saskatoons by tissue culture	Edmonton	M. Mohyuddin	ATN & HC	Ongoing	0.1	1.2
Propogation of Geraniums and chrysanthemums by tissue culture	Edmonton	M. Mohyuddin	ATN & HC	Ongoing	0.05	0.2

PROBLEM SOIL MANAGEMENT AND SOIL FERTILITY

Fertilizer requirements of irrigated grains & oilseeds	2 major locations 3 on-farm locations	R.H. McKenzie	Soils Branch	Ongoing	0.30	1.50
Fertilizer requirements of dryland crops	2 major locations	R.H. McKenzie	Soils Branch	Ongoing	0.20	0.40
Fertilizer requirements of irrigated special crops	2 major locations	R.H. McKenzie R. Gaudiel	Soils Branch ASCHRC	Ongoing	0.20	2.00

PROBLEM SOIL MANAGEMENT AND SOIL FERTILITY (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Comparison of soil testing laboratories	2 locations	R.H. McKenzie	Soils Branch	Ongoing	0.05	0.50
Intensive Crop Management trials with wheat and barley under irrigation	2 locations	R.H. McKenzie D. Penney	Soils Branch Soils Branch	Ongoing	0.05	1.50
Assessment of deep plowing, ripping and the application of amendments for improving crop growth on Solonetzic soils	48 locations	J. Lickacz	Soils Branch	Ongoing	0.50	0.50
Crop responses to liming and ripping of luvisolic soils	10 locations	J. Lickacz D. Penney	Soils Branch Soils Branch	Ongoing	0.05	0.05
Fertilizer response and soil test calibration for barley and canola	5 locations	D. Penney	Soils Branch	Completed	0.15	0.30
Response of barley to residual Cl	3 locations	D. Penney J.A. Robertson	Soils Branch U of A	1987-89	0.15	0.25
Soil acidity and liming (longevity of lime applications)	1 location	D. Penney J. Lickacz	Soils Branch Soils Branch	Active	0.10	0.20
Evaluation of Elemental Sulphur	2 locations	D. Penney D. Laverty	Soils Branch Soils Branch	1986-88	.05	.10

PROBLEM SOIL MANAGEMENT AND SOIL FERTILITY (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Nutrient requirements, crop adaptation and deep plow feasibility of Organic soils	10 locations	R. Sherstabetoff	Soils Branch	new project	0.50	0.70
Fertilizer calibration for maximum economic yield	3 locations	D. Penney E. Solberg	Soils Branch Soils Branch	1987-89	0.30	0.30
Intensive Management of barley, wheat and canola	1 location	D. Penney E. Solberg	Soils Branch Soils Branch	1986-88	0.50	0.60

WEED CONTROL

Weed control in pulses and special crops	Brooks Bow Island	R. Esau	AHRC	Active. AHRC Annual Report 1986. Expert Committee on Weeds	0.25	0.25
Chemical weed control for nursery crops and shelterbelts	Brooks	R. Esau	AHRC	Active. AHRC Annual Report 1986. Expert Committee on Weeds. Canadian Hort. Council.	0.20	0.15
Chemical weed control in small and native fruit	Brooks	R. Esau	AHRC	Active. AHRC Annual Report 1986.	0.02	0.02

WEED CONTROL (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Weed control in vegetable crops	Brooks	R. Esau	AHRC	Active. AHRC Annual Report 1986. Expert Committee on Weeds. Canadian Hort. Council.	0.25	0.28
Weed control in potatoes	Brooks	R. Esau	AHRC	Active AHRC Annual Report 1986. Expert Committee on weeds.	0.20	0.23
Herbicide residues in crop rotation	Brooks	R. Esau	AHRC	AHRC Annual Report 1986. Expert Committee on weeds.	0.08	0.07
Application of herbicides through irrigation systems	Brooks	R. Esau	AHRC	Re-activated 1986. Expert Committee on weeds.	0.03	0.07
Weed control trial and demonstration opportunities	Province-wide	D. Maurice D. Cole	Crop Protection Crop Protection	Ongoing	0.10	0.20
The effect of herbicides on several forage species	Barrhead	D. Maurice D. Cole L. Darwent P. Bergen	Crop Protection Crop Protection Ag. Canada Ag. Canada	Ongoing	0.10	0.20
Herbicide screening trial for knotweed control	Oyen Delia Castor	D. Maurice D. Cole	Crop Protection Crop Protection	Ongoing. Annual Reports to Expert Committee on Weeds	0.10	0.25

WEED CONTROL (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Herbicide screening trial and cultural control of tall buttercup in pasture	Foothills	D. Maurice D. Cole	Crop Protection Crop Protection	Initiated 1983 Continued.	0.10	0.10
Development of reclamation techniques for soil treated with residual herbicides.	Tofield Namao	D. Maurice	Crop Protection IVMAA	Initiated 1983. Continued.	0.10	0.20
The effect of weed pressure on forage yield quality and stand persistence	Westlock	D. Maurice D. Cole L. Darwent P. Bergan	Crop Protection Crop Protection Ag. Canada Ag. Canada	Ongoing	0.10	0.25
Control of scentless chamomile in cereals	Leduc	D. Maurice	Crop Protection	Ongoing	0.10	0.10
Control of milkweed in pastures	Brooks	D. Maurice	Crop Protection	Ongoing	0.10	0.10
Control of tansy on roadsides	Smoky Lake Athabasca	D. Maurice	Crop Protection	Ongoing	0.05	0.10
Suppression of toadflax in cereal crops	Three Hills High River	D. Maurice	Crop Protection	Ongoing	0.05	0.10
Suppression of toadflax in alfalfa	Stettler	D. Cole	Crop Protection	Ongoing	0.05	0.10

WEED CONTROL (continued)

PROJECT TITLE	TRIAL LOCATION	RESEARCHERS	AGENCY	STATUS AND REPORTED	PMY	TMY
Control of scentless chamomile in alfalfa	Calmar Leduc	D. Cole	Crop Protection	Ongoing	0.05	0.10
Control of round-leaved mallow in cereal crops	Three Hills	D. Maurice	Crop Protection	Ongoing	0.05	0.10
Control of stork's bill in cereal crops	Wetaskiwin Stettler Delbourne	D. Maurice	Crop Protection	Ongoing	0.05	0.10

APICULTURE/ENTOMOLOGY

Control of insects in greenhouse crops	Redcliff Medicine Hat	U. Soehngen	AHRC	Active. AHRC Annual Report 1986.	0.15	0.15
Control of corn insects	Redcliff Medicine Hat	U. Soehngen	AHRC	Active. AHRC Annual Report 1986.	0.40	0.40
Control of cabbage insects	Brooks	U. Soehngen	AHRC	Active. AHRC Annual Report 1986.	0.10	0.20
Evaluation of chemical and biological agents to control greenhouse whiteflies	Redcliff Medicine Hat	U. Soehngen M. Steiner	AHRC AEC	Active	0.15	0.10

PUBLICATIONS

A. Crop Protection Branch

Factsheets

Agdex Number	Title
121/620-1	Insects Associated with Alfalfa Seed Production
620-3	Natural Enemies of Field Crop Insect Pests in Alberta
622-4	Control of Grasshoppers in Alberta
--	The Prairie Beekeeping Manual
100/632	Seed Treatment of Cereals and Oilseeds (revised annually)
149/632-3	Blackleg of Canola
149/632-2	Diseases of Canola
632-2	Diseases of Barley
112/632-1	Diseases of Wheat
258/635-4	Blackleg of Potatoes
609-1	Managing Herbicide Residues
609-2	Grazing and Cropping Restrictions Following Use of Herbicides
608-2	The Landowner's Responsibility for Pest Control (Revised 1986)
607-2	Guidelines For Safe Use of Pesticides by Farmers (Revised 1986)
744-7	Sprayer Cleanout
606-10	Herbicide Tank Mixes
606-11	Herbicides registered for Aerial Application
625-3	Cabbage Thrips in Alberta
606-1	Guide to Crop Protection in Alberta - Part 1 - Chemical (Revised annually)

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B. Soils Branch

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120/32-1	Varieties of Annual Forage Crops for Alberta (Revised annually)
140/32-1	Varieties of Special Crops for Alberta (Revised 1986)

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A Guide to setting top yields with Samson barley

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Annual Report

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Crop Research - Feed Grain Research Program

D. Alberta Tree Nursery and Horticulture Centre

Fact Sheets

Agdex Number	Title
273/636-2	Fairy Ring Control in Lawns

Alberta Tree Nursery and Horticulture Centre Series

Number	Title
291-1	Energy Conservation and the Use of Alternative Heat
291-2	Hydroponics - A Guide to Soilless Culture (Revised)

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Bedding Plants Production Guidelines (Revised)

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*Casement, E.B. 1986. Landscaping for Rural Homes,' Lethbridge. February.

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Bag Service #47
Lacombe, Alberta TOC 1S0

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M.S.W.	Mr. Gerry Dames
M.S.W.	Mr. Brian Petherbridge
M.S.W. (Irrigation)	Mr. Steve Milne

ALBERTA HORTICULTURAL RESEARCH CENTER

Director	Mr. Thomas R. Krahn
Secretary/Personnel	Ms. Priscilla Petersen
Administrative Officer	Mr. Huber Ellis
Receptionist/Timekeeper	Ms. Betty Ann Humphreys
Accountant	Ms. Anna Moeller
Librarian/Hostess	Ms. Joyce Clark
Head, Crop Protection & Utilization Section and Plant Pathologist	Dr. Ronald Howard
Plant Pathology Technician	Mr. Ed Moskaluk
Post Harvest Specialist	Dr. Ken Mallett
Post Harvest Technologist	Mr. George Smith
Entomologist	Dr. Ulf Soehngen (to October 31, 1986)
Entomology Technologist	Mr. Art Tellier
Weed Control Specialist	Mr. Rudy Esau
Weed Control Technologist	Ms. Vicky Rumney
Food Processing and Quality Evaluation Specialist	Dr. Terry Smyrl (to January 30, 1987)
Food Processing Technician	Ms. Margaret Dench
Food Quality Technician	Mr. Joseph Hung
Diagnostician	Ms. Marilyn Dykstra
Section Secretary	Ms. Karen Chapman
Head, Horticultural Production Section Potato Specialist	Mr. Clive Schaupmeyer
Potato Technologist	Mr. Boyd Hanel
Vegetable Crops Specialist	Dr. Paul Ragan
Vegetable Crops Technologists	Mr. Murray Briant Mr. Tug Maruno
Seed Potato Specialist (Olds)	Mr. Jim Letal
Seed Potato Technologist (Olds)	Mr. Will Davies
Fruit Specialist	Mr. Lloyd Hausher
Fruit Crops Technologist	Mr. Te-Sen (Peter) Pih
Ornamental Specialist	Mr. Brendan Casement
Ornamentals Technologist	Mr. Nigel Seymour
Grounds Technologist	Mr. Greg Feth
Greenhouse Crops Specialist	Mr. Gordon Grant
Greenhouse Crops Technologist	Mr. Rick Rumney
Section Secretaries	Ms. Mayumi Tanigami-Bunney Ms. Pat Moskaluk
Head, Special Crops Section and Special Crops Specialist	Dr. Refe Gaudiel
Special Crops Technologist	Mr. Collin Wildschut
Farm Manager	Mr. Evert Borkent
Assistant Farm Manager	Mr. Henry Christesen
Heavy Duty Mechanic	Mr. Berend Witteveen
Maintenance Service Worker	Mr. Barry Merkl
Farm Worker	Mr. Willim Wise
Farm Worker	Mr. David Houseman
Farm Worker	Mr. Rudy Velting
Stockkeeper/Safety Officer	Mr. Bill Coffey

REGIONAL CROP PRODUCTION SPECIALISTS

Region 1	-	Lethbridge	Mr. Blair R. Shaw
Region 2	-	Airdrie	Mr. Larry J. Welsh
Region 3	-	Red Deer	Mr. Wayne Jackson
Region 4	-	Vermilion	Mr. Ellis L. Treffry
Region 5	-	Barrhead	Mr. William Chapman
Region 6	-	Fairview	Mr. Mike Rudakewich

REGIONAL SPECIALISTS

Region 1	-	Lethbridge	Mr. Blair Roth
Region 2	-	Airdrie	
Region 3	-	Red Deer	
Region 4	-	Vermilion	Mr. Bjorne Berg
Region 5	-	Barrhead	Mr. Ken Lopetinsky
Region 6	-	Fairview	Mr. Garry Coy